PIONEER

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS

ORDER NO.
ART-692-0

STEREO TURNTABLE

PL-L800

MODEL PL-L800 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
KC	120V only	Canada model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	U.K. model
S	110V, 120V, 220V, 240V (Switchable)	General export model
S/G	110V, 120V, 220V, 240V (Switchable)	U.S. military model

- **This service manual is applicable to the KU type. When repairing the other types, please refer to the additional service manual.**
- **Ce manuel d'instruction se refère au mode de réglage, en français.**
- **Este manual de servicio trata del método de ajuste escrito en español.**

CONTENTS

1. SPECIFICATIONS 2
2. FRONT PANEL FACILITIES 3
3. DISASSEMBLY 4
4. CIRCUIT DESCRIPTIONS 8
5. TROUBLESHOOTING 20
6. EXPLODED VIEWS 31
7. PACKING 39
8. ELECTRICAL PARTS LIST 40
9. P.C. BOARDS CONNECTION DIAGRAM 42
10. SCHEMATIC DIAGRAM 45
11. ADJUSTMENTS 48
    RÉGLAGE 50
    AJUSTE 52

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
U.S. PIONEER ELECTRONICS CORPORATION 85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.
PIONEER ELECTRONIC (EUROPE) N.V. Luithagen-Haven 9, 2030 Antwerp, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

1. SPECIFICATIONS

Motor and Turntable

Drive System ..... Direct-drive
Motor ..... Quartz PLL-Hall motor
Turntable Platter . 320 mm diam. aluminum alloy die-cast
Speeds ..... 33-1/3 and 45rpm
Wow and Flutter ..... Less than *0.012% (WRMS)
0.025% (WRMS)
0.035% (DIN)

Values marked with an "*" designate the wow and flutter for motor, and do not include the cartridge or tonearm load.

Signal-to-Noise Ratio ..... More than 78dB (DIN-B)
(with Pioneer cartridge model PC-4MC)

Rotational Characteristics

Build-up Time ..... Within 120° rotation at 33-1/3rpm
Speed Deviation ..... Less than 0.002%
Speed Drift ..... Less than 0.00008%/h at 33-1/3rpm
Less than 0.00003%/degree temp. change at 33-1/3rpm

Tonearm

Type ..... Linear Motor Direct-drive
Static-balance type, Linear-tracking arm
Effective Arm Length 162mm
Overhang 0mm
Usable Cartridge Weight ..... 3g (min.) to 8g (max.)

Subfunctions

Auto lead-in
Auto-return
Auto cut
Quick repeat
Quick play
Quick stop
Remote Tonearm Operation
Stylus pressure direct-readout counterweight
Cueing device
Free stop hinges

Miscellaneous

Power Requirements ..... AC120V ~ 60Hz
Power Consumption 22W
Dimensions ..... 420(W) x 120(H) x427(D)mm
16-9/16(W) x 4-3/4(H) x 16-13/16(D)in.
Weight 8.3kg/18lb 5oz

Accessories

EP Adapter 1
Headshell adapter 1
Operating instructions 1

PC-4MC Specifications

Type ..... Moving coil type
Stylus ..... 0.3 x 0.7 mil diamond (PN-4MC)
Output Voltage 1.5mV
(1kHz, 50mm/s peak velocity · LAT)
Tracking Force ..... 1.7g to 2.3g (Proper 2g)
Frequency Response ..... 10 to 35.000Hz
Recommended Load 50kΩ
Weight 3.1g

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

3. DISASSEMBLY

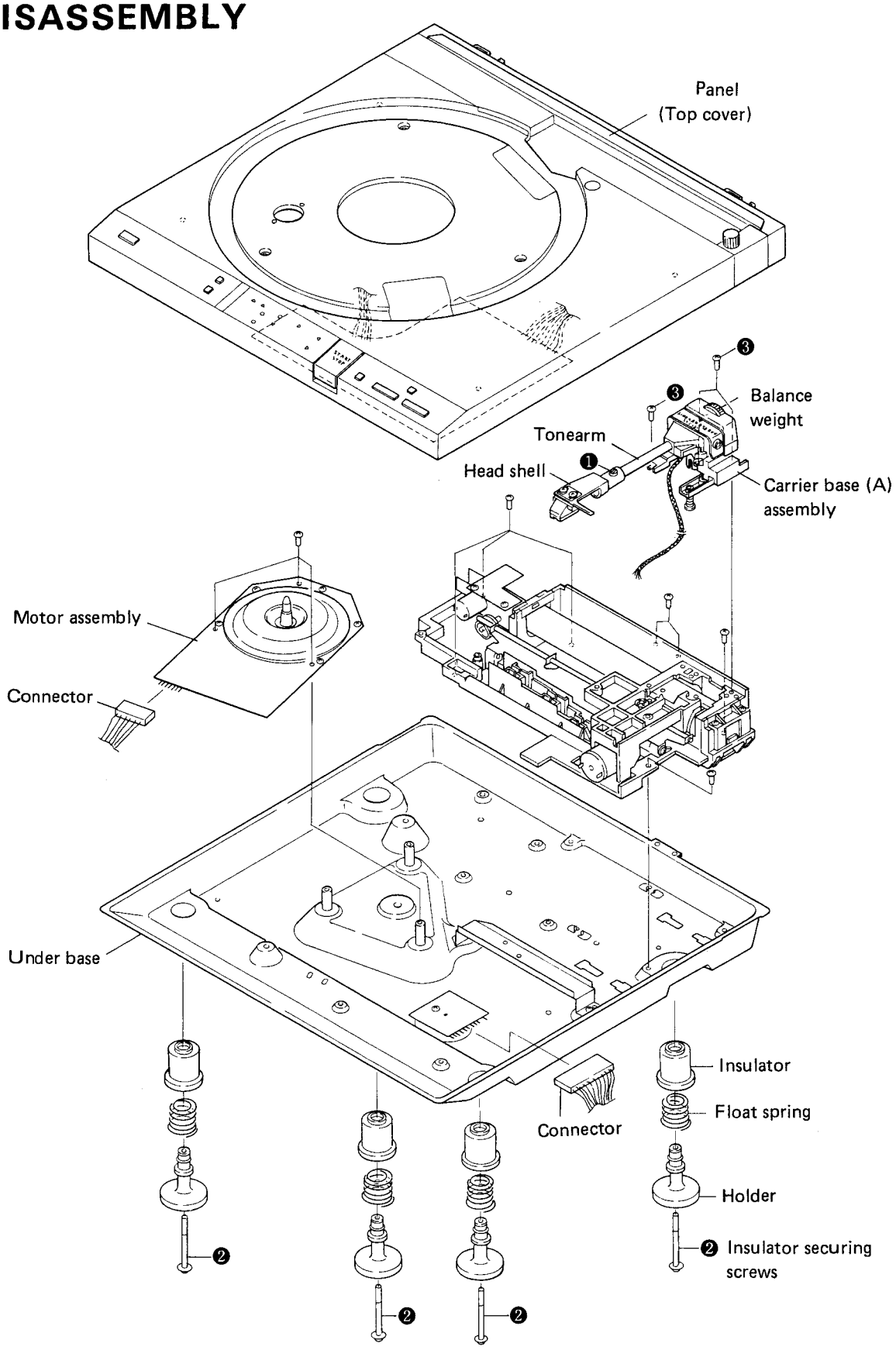
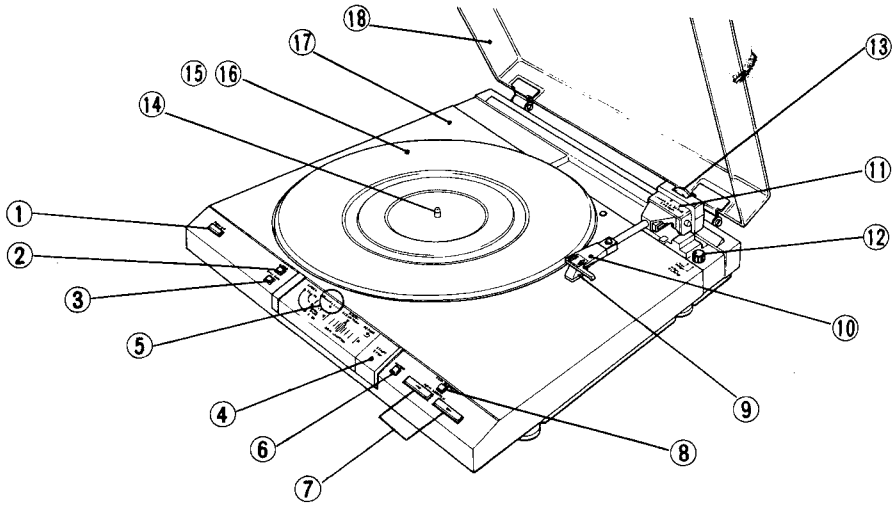


Fig. 3-1 Disassembly

2. FRONT PANEL FACILITIES



① POWER SWITCH (POWER)

Depress this switch to turn power ON and OFF.
Switch depressed – Power ON
Switch out – Power OFF
When power is turned ON, the SPEED 33, DISC SIZE 12" 30, and ARM ELEVATION lamp is illuminated.

② SPEED SELECTOR SWITCH (SPEED)/LAMP (▲33 ▲ 45)

Depress this switch until the lamp corresponding to speed of the record to be played is illuminated.
When power is turned ON- the "33" lamp is illuminated.
"33" lamp illuminated – 33 1/3 rpm LP record playback
"45" lamp illuminated – 45 rpm EP record playback

③ RECORD SIZE SELECTOR SWITCH (DISC SIZE)/LAMP (●7" 17 ●12" 30)

Depress this switch until the lamp corresponding to the record size is illuminated. When power is turned ON, the "12" 30" lamp is illumianted.
"12" 30" lamp illuminated – 30 cm (12") LP record playback
"7" 17" lamp illuminated –17 cm (7") EP record playback

④ PLAYBACK START/STOP SWITCH (START/STOP)

This switch is depressed to start automatic playback or to stop playback in the middle of a record.

⑤ QUARTZ LOCK INDICATOR (QUARTZ LOCK)

This lamp illuminates indicating accurate speed of 33 1/3 or 45 rpm.

⑥ REPEAT PLAYBACK SWITCH (REPEAT)/LAMP (⮌)

Depressing this switch will illuminate the "REPEAT" lamp and repeat playback of the present record.

⑦ TONEARM POSITIONING SWITCH (ARM LOCATION)/LAMP (◄ · ►)

Depress this switch to move the tonearm to the left or right in the manual playback mode.
Depressing the ◄ switch moves the tonearm to the left and causes the ◄ lamp to blink.
Depressing the ► switch moves the tonearm to the right and causes the ► lamp to blink.
The tonearm movement speed is variable in two steps depending on the pressure applied to the switch.
Depress firmly for fast speeds, lightly for slow speeds.

⑧ ARM ELEVATION SWITCH (ARM-ELEVATION)/LAMP (▼)

Depress this switch to raise or lower the tonearm in the manual playback mode. When power switch is turned ON, this lamp is illuminated.
Lamp illuminated (▼) – tonearm raises
Lamp extinguished – tonearm lowers

⑨ CARTRIDGE (PC-4MC)

⑩ HEADSHELL

⑪ TONEARM

⑫ ARM CLAMP KNOB (ARM CLAMP)

Turn this knob to lock the tonearm into the arm clamp.
LOCK position – tonearm locked
OPEN position – tonearm lock released. (Keep lock in this position for normal operations.)

⑬ STYLUS TRACKING FORCE ADJUSTMENT WEIGHT

Rotate this weight to adjust vertical tracking force.

⑭ CENTER SHAFT

⑮ PLATTER

⑯ RUBBER PLATTER MAT

⑰ CABINET

⑱ DUST COVER

3.1 REMOVAL OF PANEL

1. Undo screw ❶ in the tonearm, and remove the head shell (Fig. 3-2).

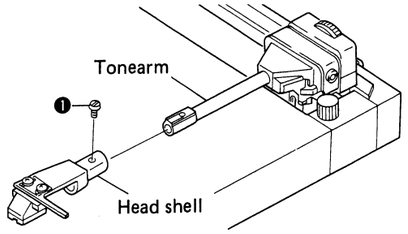


Fig. 3-2 Remove the head shell

2. Remove the balance weight from the rear of the tonearm, open the ring out as shown in Fig. 3-3 and extract the weight shaft.

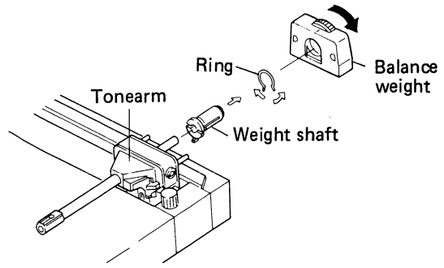


Fig. 3-3 Remove the balance weight

3. Remove the top cover and undo the four insulator securing screws ❷ (Fig. 3-1).

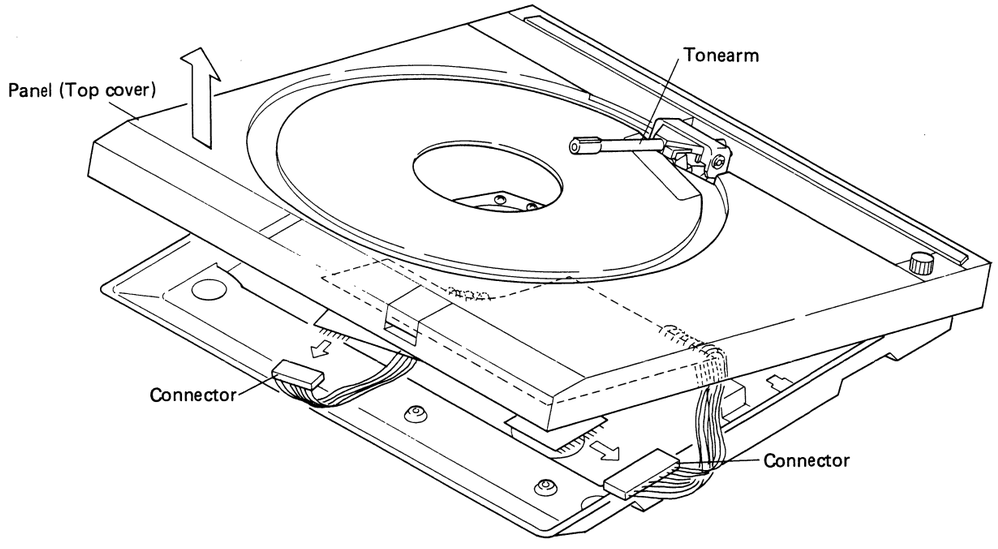


Fig. 3-5 Disconnect the two connectors

4. With the tonearm shifted across to the center, lift the pipe arm section as high as possible (see Fig. 3-4), and insert a suitable spacer in between the elevation sheet and the pipe holder in order to keep the tonearm in the raised position.

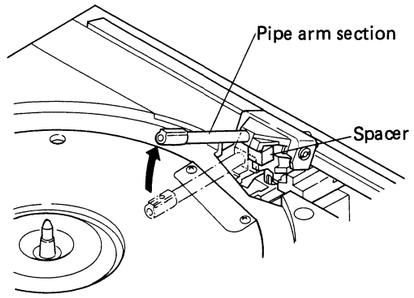


Fig. 3-4 Lift the pipe arm

5. Raise the front part of the panel, and then by inserting a hand in between the panel and the base, disconnect the two connectors(Fig. 3-5).
6. Then lift the panel and while taking care not to knock the tonearm, remove the panel with the tonearm passing through the panel opening.

3.2 REMOVAL OF TONEARM

1. Disconnect the soldered lead wires connected to the connection board and tonearm. Then remove the tape around the dynamo, and undo the three screws ❸ securing the carrier base (A) ass'y to enable removal of that ass'y (Fig. 3-6).

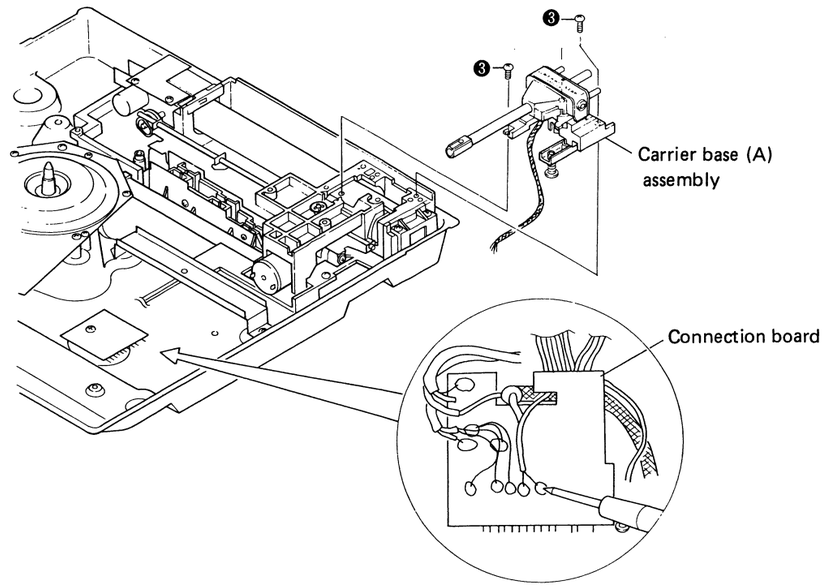


Fig. 3-6 Remove the tonearm 1

2. The CdS ass'y may be removed by unscrewing the two screws ❹. The tracking shutter section is secured to the arm pivot by screw ❺. Then by loosening the carrier base (A) ass'y tonearm securing screw (hexagonal inset head), the tonearm may be gently removed (Fig. 3-7).

3.3 PRECAUTIONS IN REMOUNTING THE TONEARM

- **CdS Ass'y Mounting**

1. With a CdS spacer sandwiched between the CdS component and the circuit board, secure the CdS temporarily by bending the CdS feet projecting through the other side of the circuit board.
2. Then align the CdS spacer base line with the center of the circuit board pattern, and allow adhesive to run in between the CdS component and the CdS spacer to join them together (Fig. 3-8).

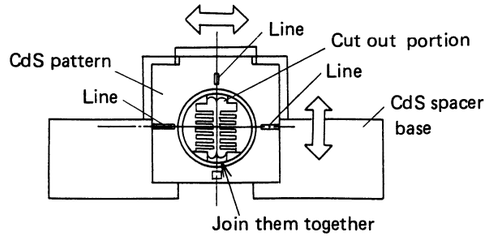


Fig. 3-8 Cds assembly mounting

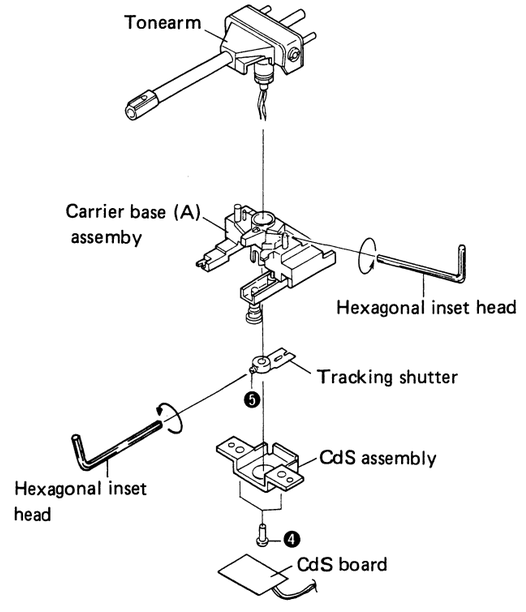


Fig. 3-7 Remove the tonearm 2

3. Then while making sure that the CdS compoent remains in position, solder the bent over CdS feet to the reverse side of the circuit board.

- **Tracking Shutter Mounting**

1. Insert the tonearm pivot section into the carrier base (A) ass'y and tighten the screw.
   Next screw the lamp board onto the carrier base. Make sure that the two lead wires from the CdS ass'y do not make contact with the tonearm pivot section at this time.
2. Then with the tracking shutter facing the direction indicated in Fig. 3-9, insert the shutter into the tonearm pivot, and tighten temporarily by screwing in until the screw meets the pivot thrust nut.
3. Arrange the tonearm operation tip to sit in the V shaped groove in the elevation sheet.
   By inserting a spacer in between the elevation sheet and carrier (A) ass'y, and then raising the elevation sheet to force the tonearm onto the sheet, tonearm lateral movement will also be restricted, thereby making it easier to work with (Fig. 3-9).

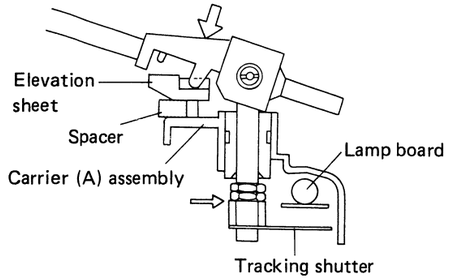


Fig. 3-9 Tracking shutter mounting 1

4. Fit the tracking shutter onto the tracking shutter positioning pin on the carrier base (A) ass'y, and retighten the screw, screwing in until the screw again meets the tonearm pivot thrust nut (Fig. 3-9).

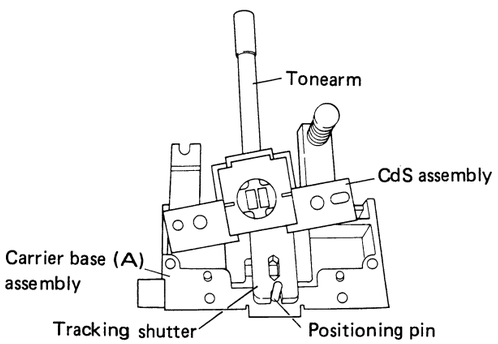


Fig. 3-9 Tracking shutter mounting 1

5. Sever the carrier base (A) ass'y positioning pin with a pair of nippers (Fig. 3-9).
6. If this positioning pin has already been severed, secure by screw in a position where the tracking shutter slit is directly over the center of the carrier base (A) ass'y (Fig. 3-10).

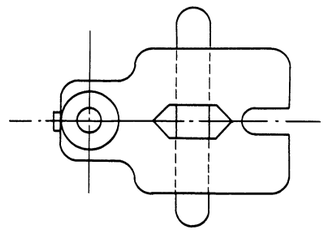
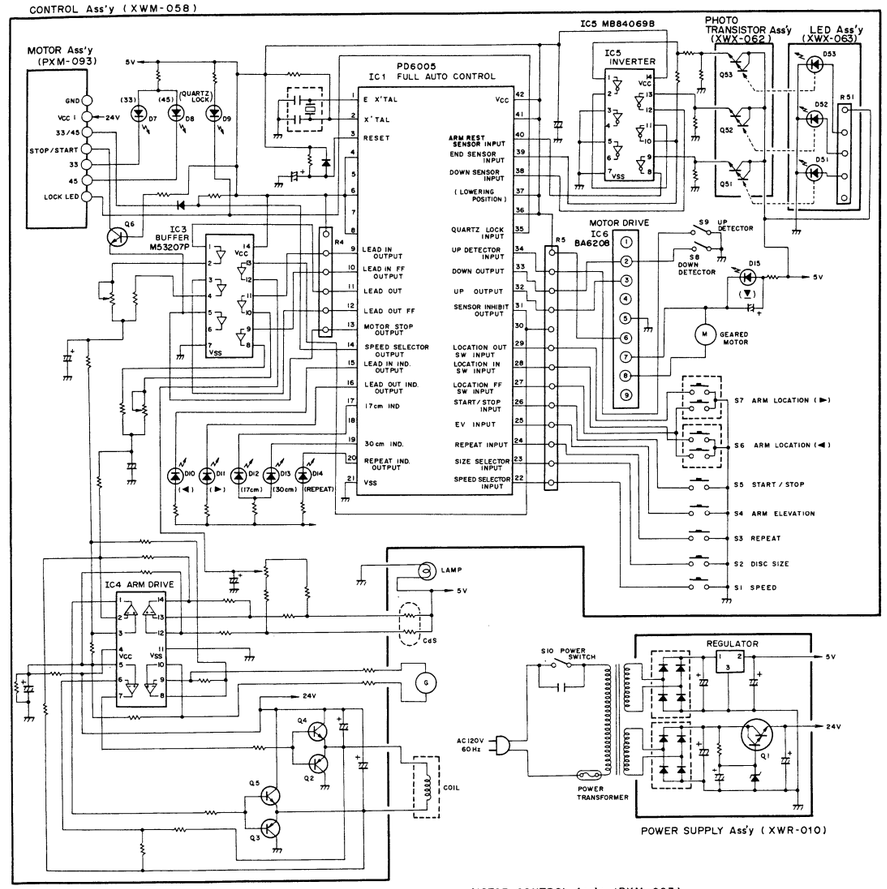
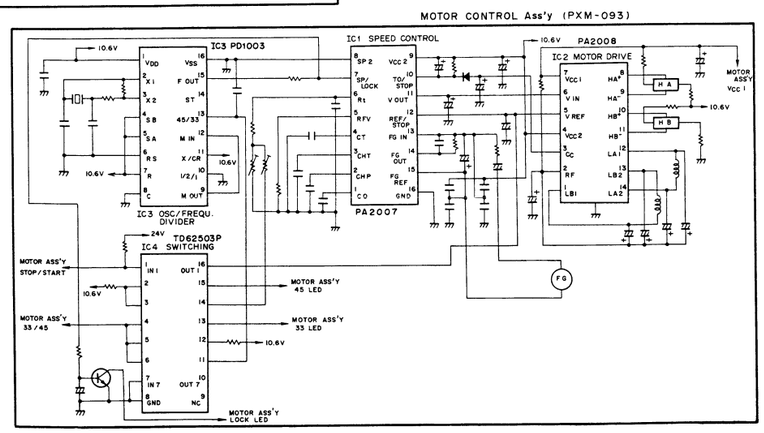


Fig. 3-10 Tracking shutter mounting 2

4. CIRCUIT DESCRIPTIONS

4.1 BLOCK DIAGRAM





second level, pins 11 and 12 are both switched to L level, both cases resulting in the tonearm being moved outwards away from the center of the record. At the same time, IC1 pin 16 is switched to H and L levels repeatedly, resulting in the lead-out indicator LED (D11) turning on and off repeatedly.
In this case, too, the LED blinks on and off slowly for the first level, and flashes on and off more rapidly for the second level.

6. When the locate-in or locate-out button is released, the locate operational mode is ended, and the tonearm is left in the up position.

> If the locate-in button is pressed continuously while the tonearm is still in the arm rest, the tonearm is moved across to the record in accordance to steps 1 and 2 of the auto lead-in operation (section 6.1 described above), and then immediately moved towards the center of the record.

■ Arm Elevation Operation

1. If the arm elevation switch (S4) is pressed while a record is being played (with the arm elevation down) IC1 pin 32 is switched to H level and pin 33 to L level (IC6 pin 8 is also switched to H level and pin 7 to L level), resulting in the geared motor starting to rotate in the up direction.
2. Since arm elevation is switched up, the tonearm will start to rise. And since IC6 pin 7 has been switched to L level, the up indicator LED (D15) will be turned on.
3. As the geared motor continues to rotate, the elevation cam pushes against the up detector switch (S9), resulting in the application of L level to IC1 pin 34.
4. Upon reception of this signal, IC1 pins 32 and 33 are switched to H level (and IC6 pins 7 and 8 to L level), thereby stopping the geared motor. The tonearm is thus left in the up position, and record play is suspended.

> The tonearm indicator LED (D15) will remain on as long as IC6 pin 7 is held at L level.

5. If the elevation switch (S4) is pressed again, IC1 pin 33 is switched to H level and pin 32 to L level (IC6 pin 7 switched to H level and pin 8 to L level) resulting in the elevation geared motor starting to rotate in the down direction.
6. As the geared motor continues to rotate, the elevation cam pushes against the down detector

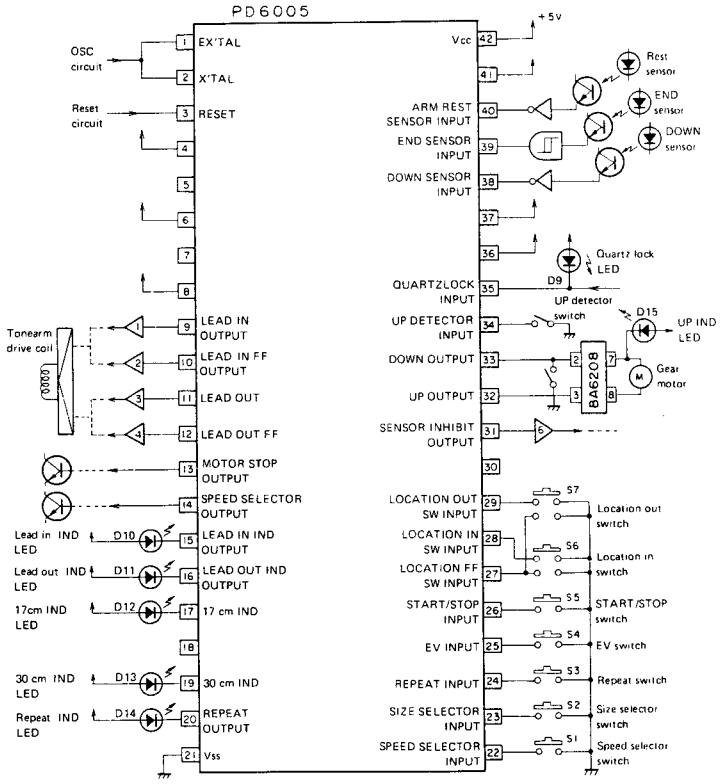


Fig. 4-1 PD6005 Pin function

4.2 CIRCUIT OPERATIONS

The operations described in the section assume that a 17cm record is being played at 33 rpm.

■ Auto Lead-in Operation

1. When the START/STOP button (switch S5) is pressed, pin 26 of PD6005 is switched to L level, resulting in pin 15 also being switched to L level, thereby turning the lead-in indicator LED (D10) on. At the same time, pin 13 is also switched to L level, resulting in the motor ass'y (IC4) being activated via Q6.
   The phono motor is thereby started (and turntable rotation commenced).
2. When the turntable attains the rated rotational speed, the quartz lock indicator LED (D9) is turned on.
   Pin 35 of IC1 is also switched to L level at the same time, resulting in pins 9 and 10 of the same IC being switched to L level, thereby commencing the tonearm lead-in movement. (See page 12 for details of drive coil activation).

> If the tonearm has been inadvertently left clamped into the arm rest at this time, pins 15 and 16 of IC1 will commence to switch back and forth between H and L levels approximately 7 seconds after the START/STOP button is pressed thereby causing the lead-in indicator LED (D10) and the lead-out indicator LED (D11) to flash on and off. And if the tonearm has still not left the arm rest after a further 10 seconds, the PL-L800 will cancel the play preparations.
> Note that play preparations will also be cancelled if the turntable fails to attain the rated rotational speed within about 17 seconds after pressing the START/STOP button.

3. When the tonearm moves across to the record, the lowering position sensor (LED D52 and photo-sensitive transistor Q52) first applies a 30 cm lowering position signal, and then a 17cm lowering position signal to pin 38 of IC1 (L level signals). (With 17 cm records, IC1 counts the seconds signal to judge the lowering position).
4. When the tonearm reaches the lowering position, pins 9 and 10 of IC1 are reverted to H level, the current applied to the relevant drive coil cut, and the lateral movement of the tonearm consequently halted.
   IC1 pin 15 is also reverted to H level, resulting in the lead-in indicator LED (D10) being turned off.
5. IC1 pin 33 is switched to H level while pin 32 is switched to L level (pin 7 of IC6 BA6208 to H level and pin 8 to L level), resulting in the elevation geared motor turning in the down direction for the tonearm to be lowered onto the record. Since IC6 pin 7 has also been switched to H level, the up indicator LED (D15) is turned off at this time.
6. As the geared motor continues to turn, the elevation cam eventually presses against the down detector switch (S8), resulting in IC6 pin 2 and IC1 pin 33 being switched to L level, thereby stopping the geared motor. The tonearm consequently lands gently on the record for start of play.

> If the START/STOP button is pressed again during this auto lead-in operation, the PL-L800 switches over to the auto stop operational mode. And if the locate-in or locate-out button is pressed during auto lead-in, the PL-L800 cancels the play preparations, and switches directly to locate operational mode.

■ Locate-in and Locate-out Operation Modes

1. If the locate-in or locate-out button is pressed continuously while a records is being played, the tonearm is lifted away from the record, and locate operational mode is commenced.
2. The locate-in and locate-out buttons are double-action switches. If pressed (continuously) to the first level, the tonearm will move slowly, but if pressed (continuously) to the second level, the tonearm will move at a faster rate.
3. When the locate-in button (switch S6) is pressed continuously to the first level, IC1 pin 28 is switched to L level, resulting in pin 9 also being switched to L level, and the tonearm consequently being moved towards the center of the record. At the same time, IC1 pin 15 is slowly switched to H and L levels repeatedly, resulting in the lead-in indicator LED (D10) blinking on and off repeatedly.
4. If the locate-in button is pressed in further to the second level (and kept in this position) IC1 pins 9 and 10 are both switched to L level, resulting in the tonearm being moved inwards at a faster rate. At the same time, IC1 pin 15 is switched rapidly and repeatedly to H and L levels, resulting in the lead-in indicator LED (D10) flashing on and off more rapidly.
5. When the locate-out button (switch S7) is pressed continuously to the first level, IC1 pin 11 is switched to L level, while if pressed to the

switch (S8), resulting in IC1 pin 33 (and IC6 pin 2) being switched to L level), thereby stopping the geared motor. The tonearm thus completes the lowering movement and resumes play of the record.

> If the elevation button is pressed while the tonearm is being lifted or lowered, the tonearm will immediately start to move in the opposite direction.

■ Auto Return Operation

1. When the tonearm approaches the lead-out groove during record play, the end sensor (LED D53 and photo-sensitive transistor Q53) will start to apply H/L pulse signals to pin 39 of IC1.
2. When the stylus finally enters the lead-out groove, the pulse width becomes narrow, and IC1 thereby detects the fact that record play has finished.
3. Once end of play has been detected, IC1 pin 32 is switched to H level and pin 33 to L level (and IC6 pin 8 is switched to H level and pin 7 to L level), resulting in the geared motor starting to rotate in the up direction to lift the tonearm away from the record.
4. As the geared motor continues to rotate up, the elevation cam pushes against the up detector switch (S9). The subsequent chain of events is the same as described in steps 1 to 4 in "Arm Elevation Operation".
5. The up indicator LED (D15) is turned on as soon as IC6 pin 7 is switched to L level. And when IC1 pin 16 is switched to L level following detection of end of play, the lead-out indicator LED (D11) is turned on.
6. After the tonearm has completed the up movement and the geared motor has stopped, IC1 pins 11 and 12 is switched to L level, resulting in the tonearm commencing the lead-out operation moving towards the arm rest (drive coil activated).
7. And as long as the auto repeat button (switch S3) has not been pressed by this time, the tonearm will continue the lead-out operation. When the tonearm is near the arm rest, the rest sensor (LED D51 and photo-sensitive transistor Q51) applies signals to IC1, resulting in pin 40 being switched to H level.
8. The lead-out operation mode is maintained for about 1.5 seconds after detection by the arm sensor (1.5 seconds being sufficient for the tonearm to reach the arm rest).
9. Then after 1.5 seconds, IC1 pins 11 and 12 are reverted to H level and the drive coil deactivated, thereby completing the lateral tonearm lead-out operation.
10. At the same time, IC1 pin 13 is switched to H level, and turntable rotation is stopped by the motor ass'y (IC4) via Q6. The quartz lock LED (D9) is also turned off.
11. Pin 16 of IC1 is reverted to H level, resulting in the lead-out indicator LED (D11) being turned off to mark completion of the auto-return operation.

> Note that the tonearm completes the auto-return operation in the up position, and the up indicator LED (D15) remains on.

■ Auto Stop Operation

1. If the START/STOP button (switch S5) is pressed during record play, IC1 pin 26 is switched to L level, thereby resulting in auto-stop mode.
2. For details of operation, refer to "Auto Return Operation" above.

> When the START/STOP button is pressed for auto-stop operation, the auto-repeat mode will be cancelled (if it has been set). IC1 pin 20 is switched to H level, and the repeat indicator LED (D14) turned off.

■ Auto-repeat

1. When the repeat button (switch S3) is pressed, IC1 pin 20 is switched to L level, resulting in the repeat indicator LED (D14) being turned on, and the PL-L800 being switched to auto-repeat mode.
2. If the auto-return operation is started while the repeat button is pressed, the tonearm will first complete the up movement, and then commence the lead-out operation, moving towards the outside edge of the record.
3. When the tonearm then reaches the position designated by the DISC SIZE switch (S2) the size — 17cm or 30cm — of the record presently being played), IC1 identifies the tonearm lowering position according to the output signals (first signal for 17cm position and second signal for 30cm position) from the lowering position sensor (LED D52 and photo-sensitive transistor Q52).
4. When the tonearm reaches the lowering position, IC1 cancels the drive coil current in order to lower the tonearm for recommencement of play.
5. When the repeat button is pressed during auto-repeat mode, IC1 pin 20 is reverted to H level, resulting in cancellation of the auto-repeat mode. The repeat indicator LED (D14) is also turned off at the same time.

> This auto-repeat mode is cancelled automatically if the auto-stop operation is activated, and also if the power is switched off.

■ Tonearm Drive Circuit

1. The drive circuit diagram is outlined in Fig. 4-2. The major components in this circuit are the differential amplifier and AMP1.

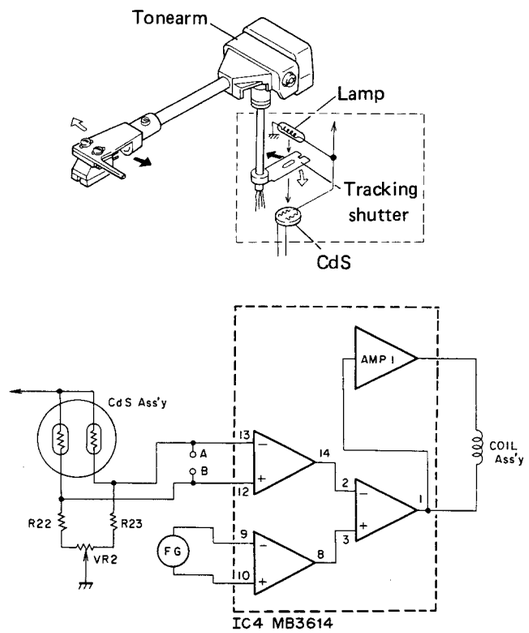


Fig. 4-2 Tonearm drive outline

2. Amplification signals from the tracking sensor are applied to the minus side of the differential amplifier, while amplification signals from the tonearm speed detector generator are applied to the plus side.
3. When the stylus is perpendicular to the carrier, or when there are no operation signals (auto lead-in, auto-return, auto-cut, locate-in, locate-out) from the control stage, the plus and minus inputs of the differential amplifier are balanced in relation to the reference voltage, so no current will flow through the drive coil.
4. When the carrier is moved (by tonearm movement), auto lead-in or auto-return signals, etc are applied to the plus or minus side of the differential amplifier, resulting in loss of potential balance between the plus and minus inputs, and the consequent flow of current through the drive coil.

■ Tracking Sensor Stage

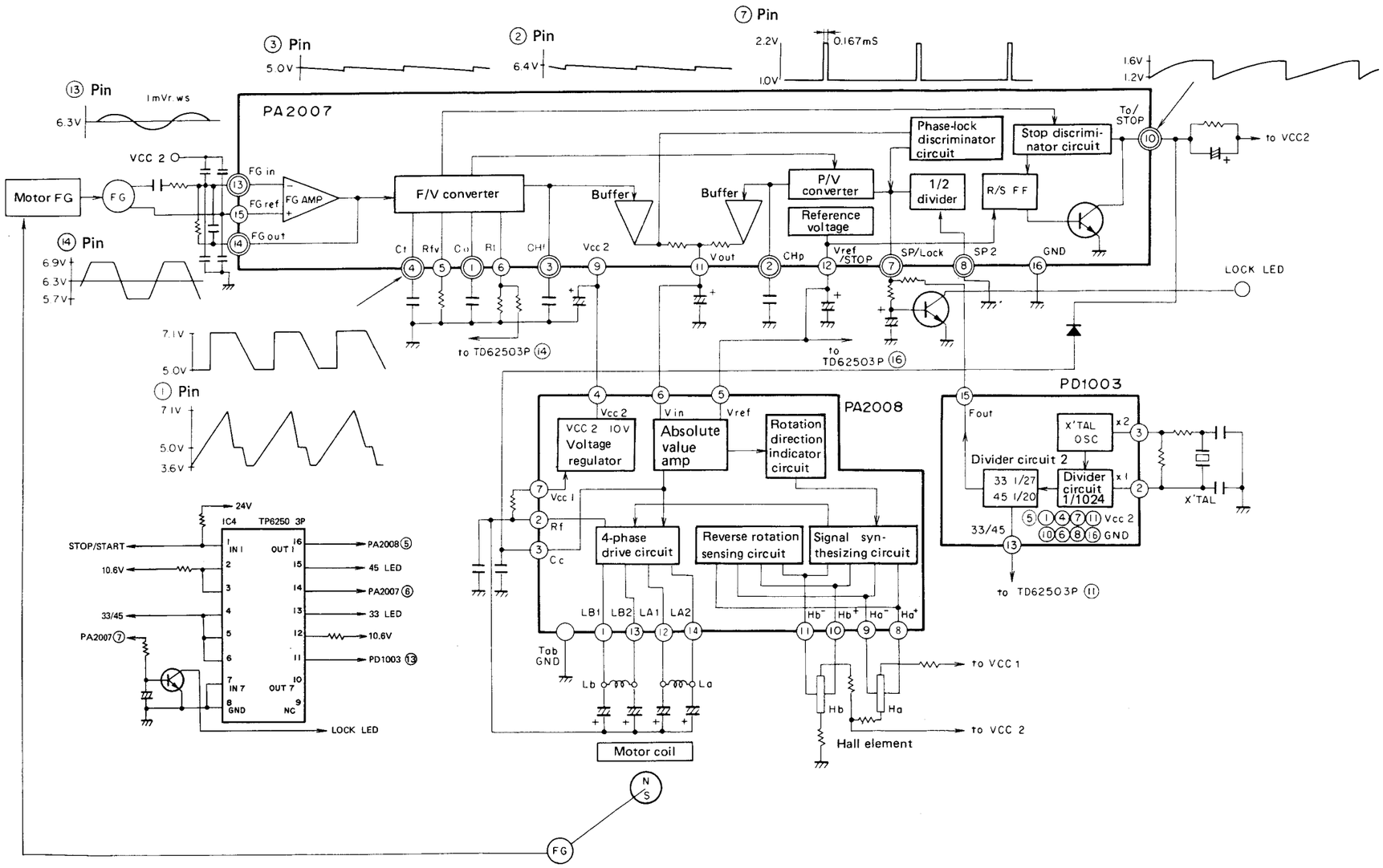
1. The structure of the tracking sensor stage is outlined in Fig. 4-2. The major component circuit is the bridge including two CdS elements, R22, R23 and VR2. VR2 is used to adjust the potential difference between A and B to zero when the stylus and carrier are at right angles to each other.
2. When the stylus is perpendicular to the carrier, the beam of light from the lamp is passed through the shutter with equal amounts of light reaching the two CdS elements. The corresponding CdS resistances will, therefore, be equal.
3. If the stylus is moved to either left or right, there will be a change in the relative amounts of light beamed onto the CdS elements, resulting in the resistance in one CdS element being made higher than the other, and thereby generating a potential difference between A and B.
4. In other words, the carrier remains still as long as the stylus is at right angles to the carrier, but is moved to left or right due to the flow of a coil current obtained by amplifying the potential difference generated between A and B when the stylus moves to left or right in respect to the carrier.

■ Speed Switching

1. Turntable speed is changed by pressing the SPEED button (switch S1). If the speed is already 33 rpm, pressing the SPEED button will change the speed to 45 rpm, and vice versa.
2. When the SPEED button (switch S1) is pressed, IC1 pin 22 is switched to L level, resulting in IC1 pin 14 also being switched to L level and the motor ass'y being activated via IC4 for speed switching purposes.
3. At the same time, either LED D7 (for 33 rpm) or LED D8 (for 45 rpm) is turned on by a signal from the motor ass'y.

4.3 MOTOR ASSEMBLY

■ Block Diagram



The newly developed quartz PLL Hall element motor used in the PL-L800 features a number of basic improvements over motors traditionally employed as turntable drive motors.

■ Basic Differences

1. PA2005: 6-phase drive circuit; three Hall elements.
   PA2008: 4-phase drive circuit; two Hall elements.
2. PA2004: 2-frequency F/V converter circuit.
   PA2007: Single-frequency F/V converter circuit (loop gain increase)
3. The stop circuit previously fabricated in PA2005 is now included in PA2007. Another new function is the lock indicator illumination circuit built into PA2007. Also, the pins of the control IC PA2007 are provided with multi-function capability for increased control versatility.

■ Simple Signal Path

The PL-L800 motor drive circuit consists of the control IC PA2007, reference phase generator IC PD1003, motor drive IC PA2008, and IC TD62503P functioning to produce the various operational switch signals.

The signal picked up from the speed sensor section is amplified by the FG amp, then converted to the speed sensor signal voltage (DC) by the F/V converter.

Reference phase voltage is obtained by extracting the reference phase from PD1003 pin 15, then sending it through the P/V converter to be used as reference phase voltage (DC).

The speed sensor signal voltage and reference phase voltage are each passed through a buffer amp and resistance and combined (compared). The resulting voltage is taken from the IC PA2008 pin 6 and input into the absolute value amp, and is used to control the 4-phase drive circuit motor rotation voltage, maintaining the motor at a fixed speed.

■ Speed Sensor Section

1. The speed sensor board consists of a single printed circuit.
2. Above this, rotates a rotor with 200 magnetized poles on its lower face. Output varies in accordance with the rotational speed of the rotor.
3. The output (frequency) from the speed sensor board is 55.5Hz for 33 1/3 rpm and 75Hz for 45 rpm.
4. The output signal is sent to PA2007 as a balanced input.

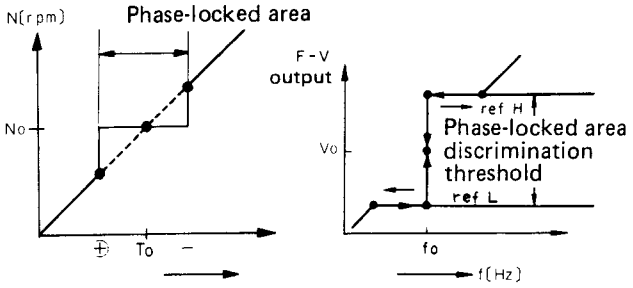


Fig. 4-8 F/V converter output

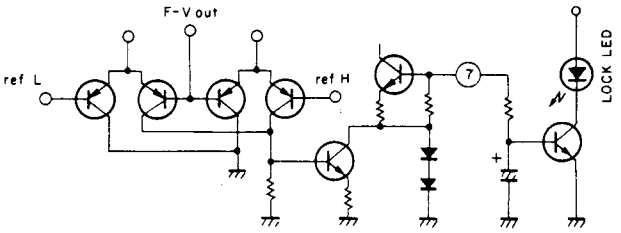


Fig. 4-9 Phase-locked discrimination theoretical circuit

■ Stop Discriminator Circuit

1. Depressing the START/STOP button of the PL-L800 transmits a stop signal generating a reverse torque and applying a brake to the motor. Motor rotation stops almost immediately.
2. The stop discriminator circuit functions to detect low or high rotation speed through the charge/discharge status of capacitors and resistors connected to IC PA2007 pin 10 (To/STOP), and when rotation drops below a certain speed, motor torque is dropped to zero. A theoretical circuit diagram is shown in Fig. 4-10.
3. After that, the platter turns a small amount due to inertia, then stops.

■ Absolute Value Amp and Rotation Direction Indicator Circuit

1. The signal at the 6 pin (control input) is compared with the signal at the 5 pin (reference voltage) and the difference in voltage is used to generate current in the motor winding. The input/output characteristics are shown in Fig. 4-11.
2. The control input is higher than the reference voltage (Vref 5V) when the rotation of the platter is higher than specified speed. When this occurs, the absolute value amp sends an indication (instruction) to the rotation direction indicator circuit to generate reverse torque in order to drop the speed of the motor.
3. The control input is lower than the reference voltage (Vref 5V) when the rotation of the platter is lower than specified speed. When this occurs, the absolute value amp sends an indication (instruction) to the rotation direction indicator circuit to generate forward torque in order to increase the speed of the motor.

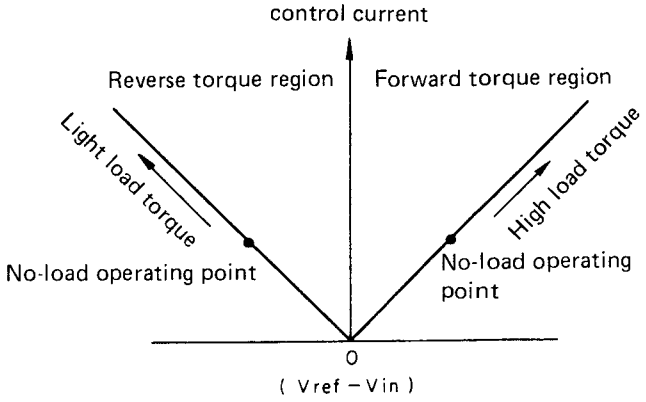


Fig. 4-11 Input/output characteristics

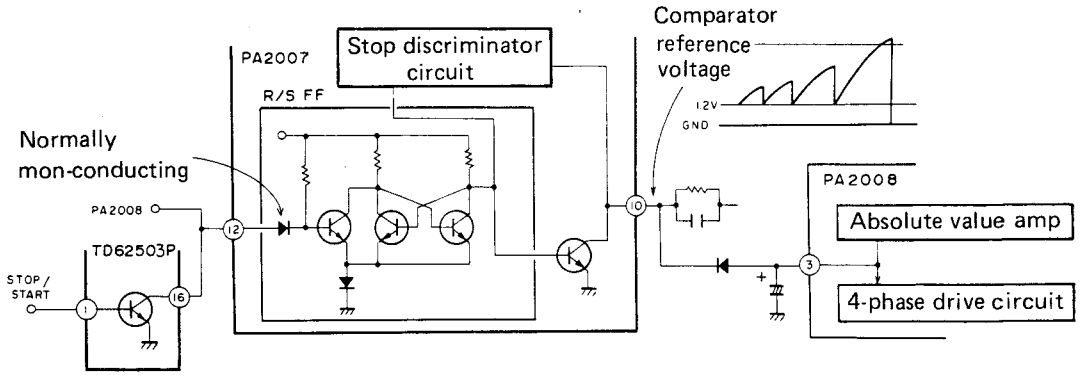


Fig. 4-10 Stop discriminator theoretical circuit

■ FG AMP

In order to square the waveform of the signal obtained from the speed sensor section (output: 0.5 — 2.0 mV rms) prior to inputting it into the F/V converter, it is amplified 69dB across a band width of 20 to 160Hz.

■ F/V Converter

1. Since the rotational speed is detected at a fixed frequency, the frequency must be converted to a voltage (DC). This function is performed by the F/V converter.
2. Previously (in PA2004) this was done by a 2-frequency F/V converter, however, increasing control gain of PA2007 allows a signal-frequency F/V to be used.
3. F/V converter gain does not change even with rpm changes.
4. Switching reference frequency is shown in Fig. 4-5.
   When the switch is OFF, speed is set to 33 1/3 rpm, and when the switch is ON, the variable resistor used by 33 1/3 rpm is connected parallel to the 45 rpm variable resistor. The resulting total impedance establishes rotational speed. Thus, each time 33 1/3 rpm is adjusted, 45 rpm must also be adjusted. This arrangement prevents any rotational instability that might result from both switches being temporarily OFF when speed changes are made by switching from 33 1/3 — 45 rpm.
5. Co, Ct, Rt, and Rfv are each connected to ground, but the grounding point is very close to that of PA2007. Also, Rt is a 0.01 μF ceramic capacitor for noise and oscillation removal, and it is grounded in close proximity to PA2007 too.

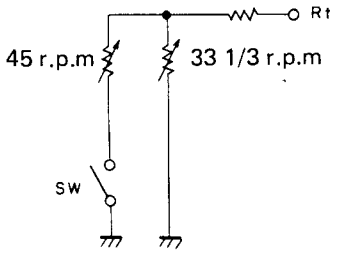


Fig. 4-5 Switching reference frequency

■ Reference Phase Generator IC PD1003

1. When power is turned ON, the X'tal oscillator block generates a 6.144 MHz signal by using the externally connected crystal oscillator.
2. This is reduced to 1.5kHz by divider circuit 1 (1/4096), then this divided signal is input to divider circuit 2.
3. The 6kHz signal input to divider circuit 2 is further divided 1/27 for 33 1/3 rpm operation, and 1/20 for 45 rpm, then transmitted from pin 15 to PA2007 pin 7.
   33 1/3 rpm: 55.5Hz
   45 rpm: 75Hz

■ P/V Converter

The signal received at the 7 pin (item above) is input to the P/V converter. The P/V converter serves to convert the reference phase to DC voltage.

The reference phase converted into DC voltage is combined (by the buffer amp and resistor) with the DC voltage from the F/V converter (and used for rotation speed) and transmitted from pin 11 as a motor rotation speed control signal to IC PA2008 pin 6, then finally to the absolute value amp (Fig. 4-6).

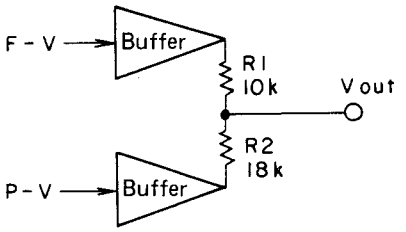


Fig. 4-6 (F—V) + (P—V) circuit

■ Phase-lock Discriminator Circuit

When phase control is in effect, the output characteristics of the F/V converter appear as in Fig. 4-7. The portion that shows no change in speed when load torque is varied up and down can be considered as the phase-locked area, and the portion where large rotational speed changes occur (as in Fig. 4-8) is outside the phase-locked area. Thus, F/V converter output can be input into an absolute value comparator having an upper and lower threshold. A theoretical diagram of such a circuit is shown in Fig. 4-9.

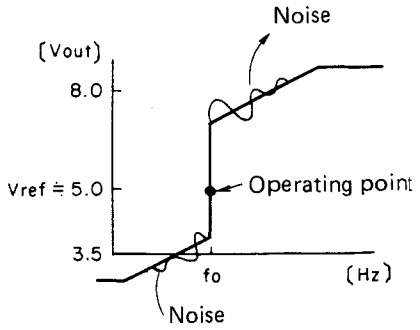
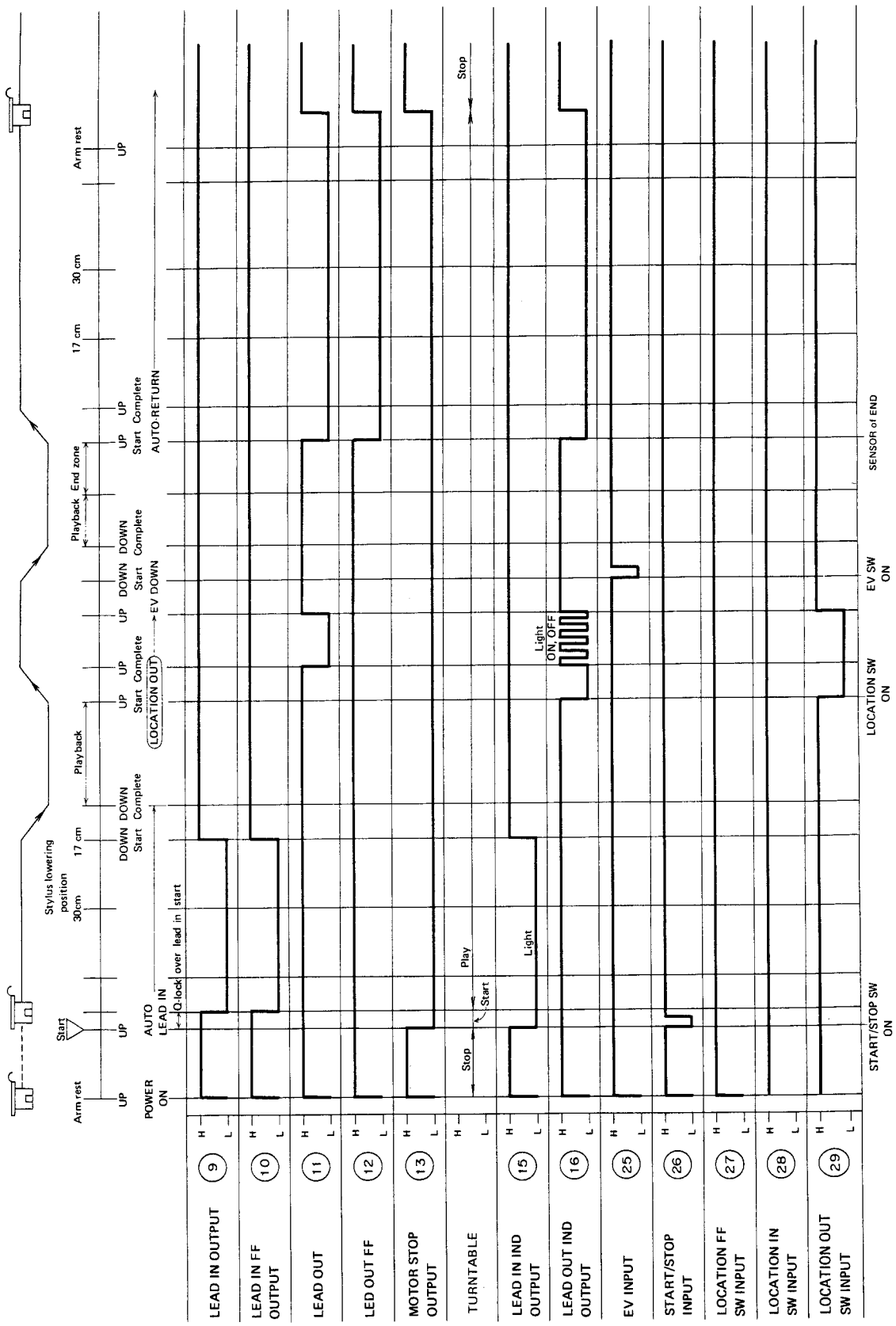


Fig. 4-7 Input/output characteristics

■ Timing Chart 1



■ Drive Circuit

1. The HA and HB Hall elements (6 magnetized pole pieces fixed to the circumference of the motor) are attached electrically 90° out of phase with each other. These elements are used to sense the rotational position of the motor.
2. The position sensing signal produced by the Hall elements are each output to the block diagram position signal synthesizing circuit, and their waveforms are shaped as shown in Fig. 4-12.
3. The staircase waves are each input into the block diagram 4-phase drive circuit, and as shown in Fig. 4-12, LA and LB alternate back and forth in a 90° duty cycle (voltage) to turn the motor.
4. LA and LB amplitude is in proportion to the output of the absolute value amp.

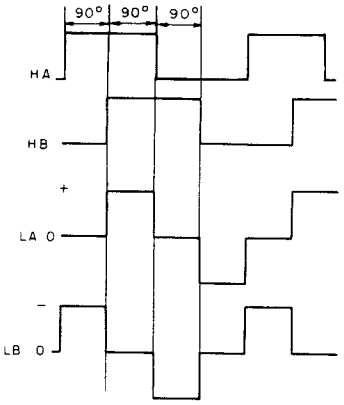


Fig. 4-12 Drive circuit waveforms

■ Reverse Rotation Sensing Circuit

1. The motor used in the PL-L800 is the dual-direction drive circuit type, and if manually forced in the reverse direction, it will continue to apply a forward torque in an attempt to restore forward rotation as long as it does not exceed specified rotation speed.
2. However, when reverse rotation exceeds 45 or 33 1/3 rpm, the rotation direction indicator circuit detects this as an overrun in the forward direction and applies reverse torque in an attempt to bring it to specified rotation speed.
3. Reverse torque applied to the platter already rotating in reverse will further increase the speed and the turntable will run out of control.
4. The reverse rotation guard circuit prevents the platter from running out of control.
5. The equivalent circuit of the reverse rotation sensing circuit consists of a D type flip-flop (D input output at Q by CK triggering).

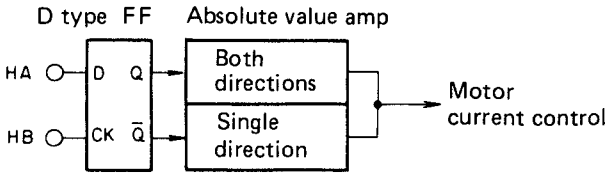


Fig. 4-13 Reverse rotation sensor equivalent circuit

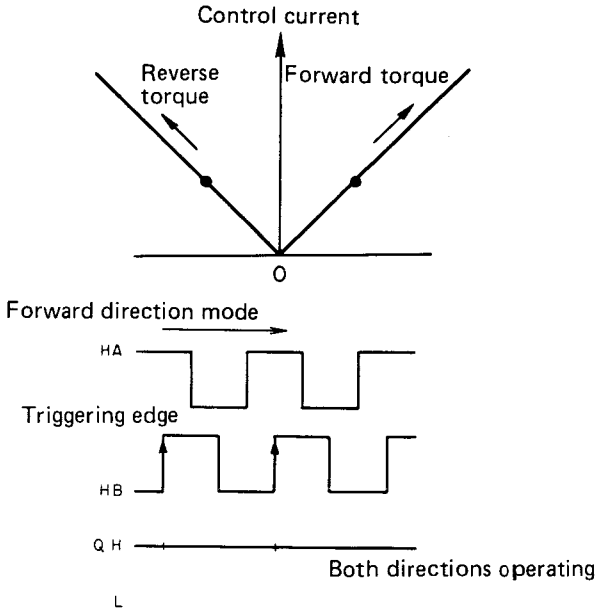


Fig. 4-14 Forward direction mode

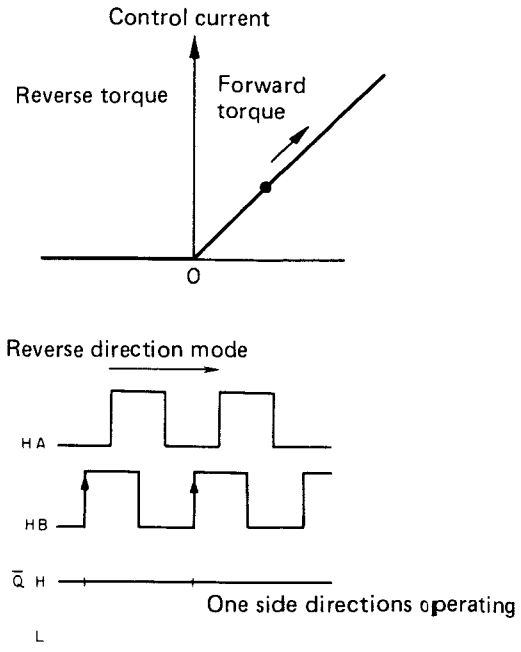


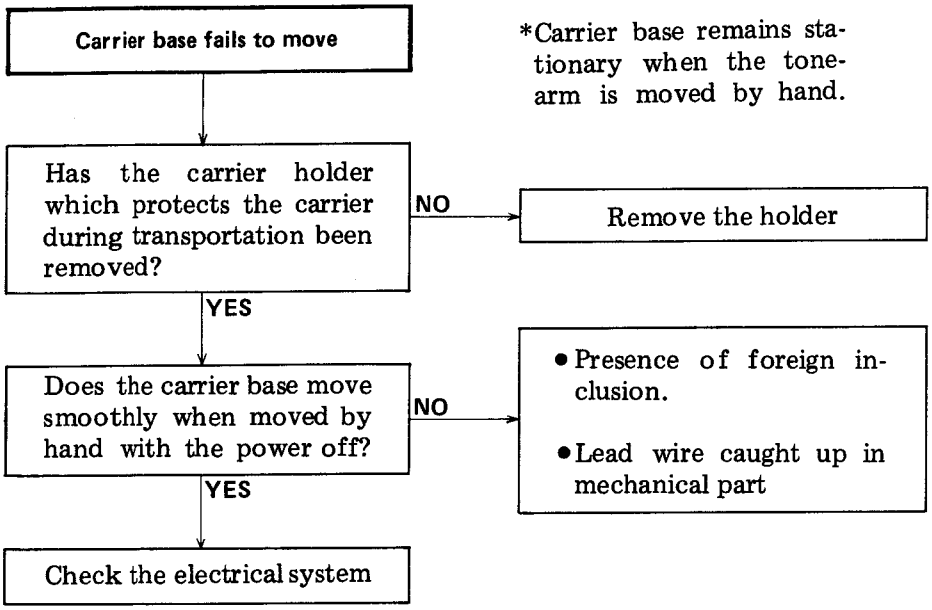
Fig. 4-15 Reverse direction mode

5. TROUBLESHOOTING

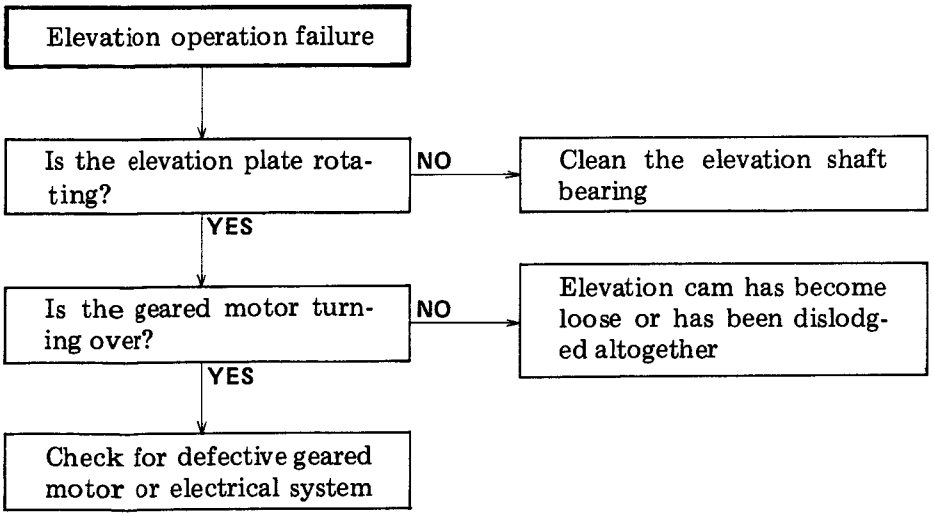
5.1 MECHANICAL CHECKS

Place the tonearm in the arm rest, and switch the power on.

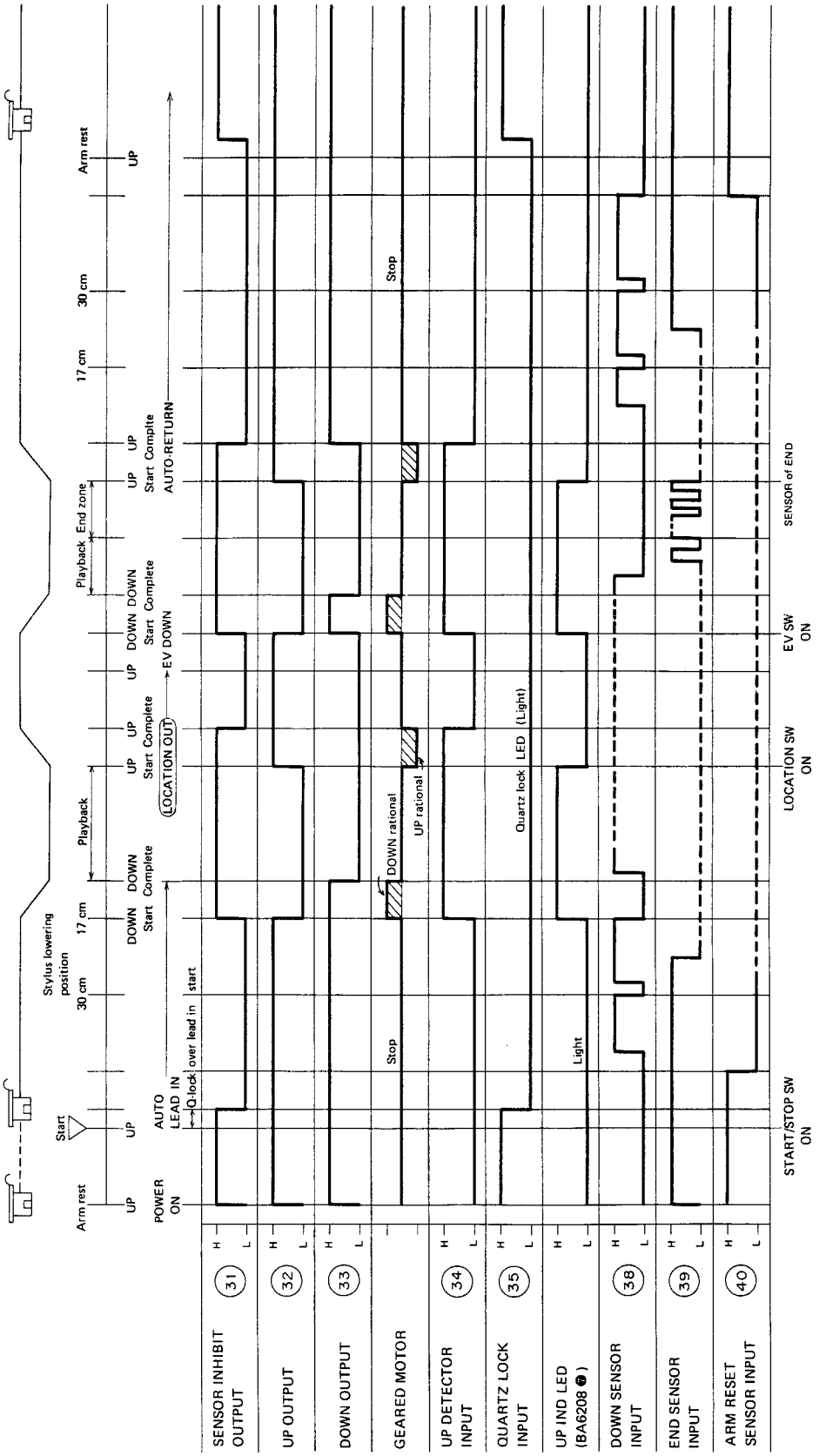
■ Carrier Fails to Move


Carrier base fails to move
*Carrier base remains stationary when the tonearm is moved by hand.
Has the carrier holder which protects the carrier during transportation been removed?
NO
Remove the holder
YES
Does the carrier base move smoothly when moved by hand with the power off?
NO
• Presence of foreign inclusion.
• Lead wire caught up in mechanical part
YES
Check the electrical system

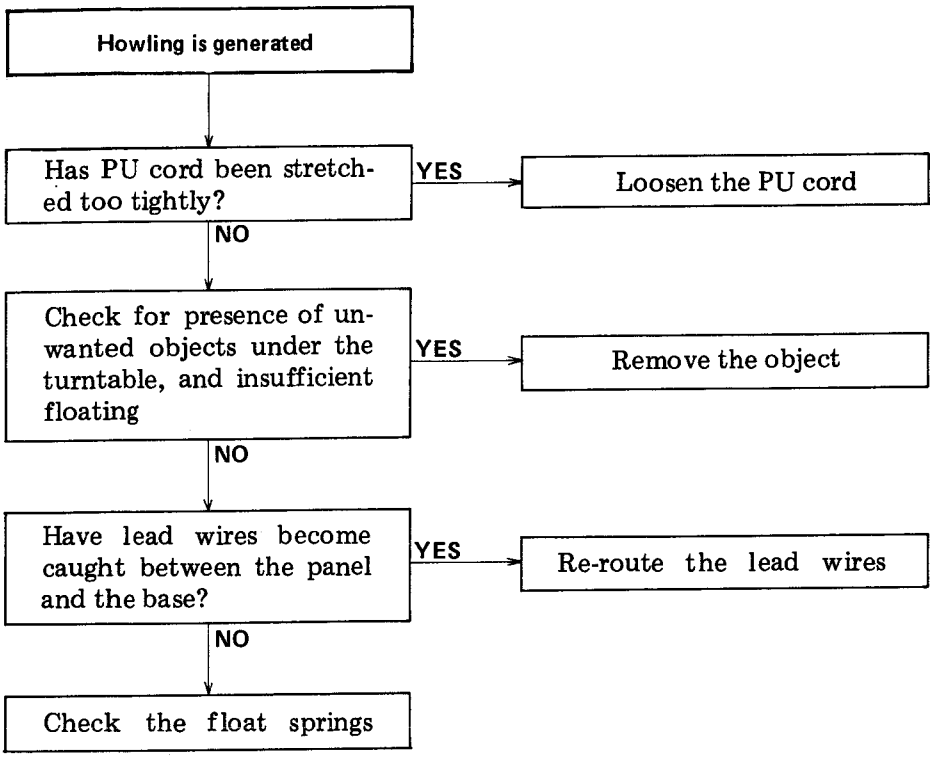
■ Elevation Operation Failure


Elevation operation failure
Is the elevation plate rotating?
NO
Clean the elevation shaft bearing
YES
Is the geared motor turning over?
NO
Elevation cam has become loose or has been dislodged altogether
YES
Check for defective geared motor or electrical system

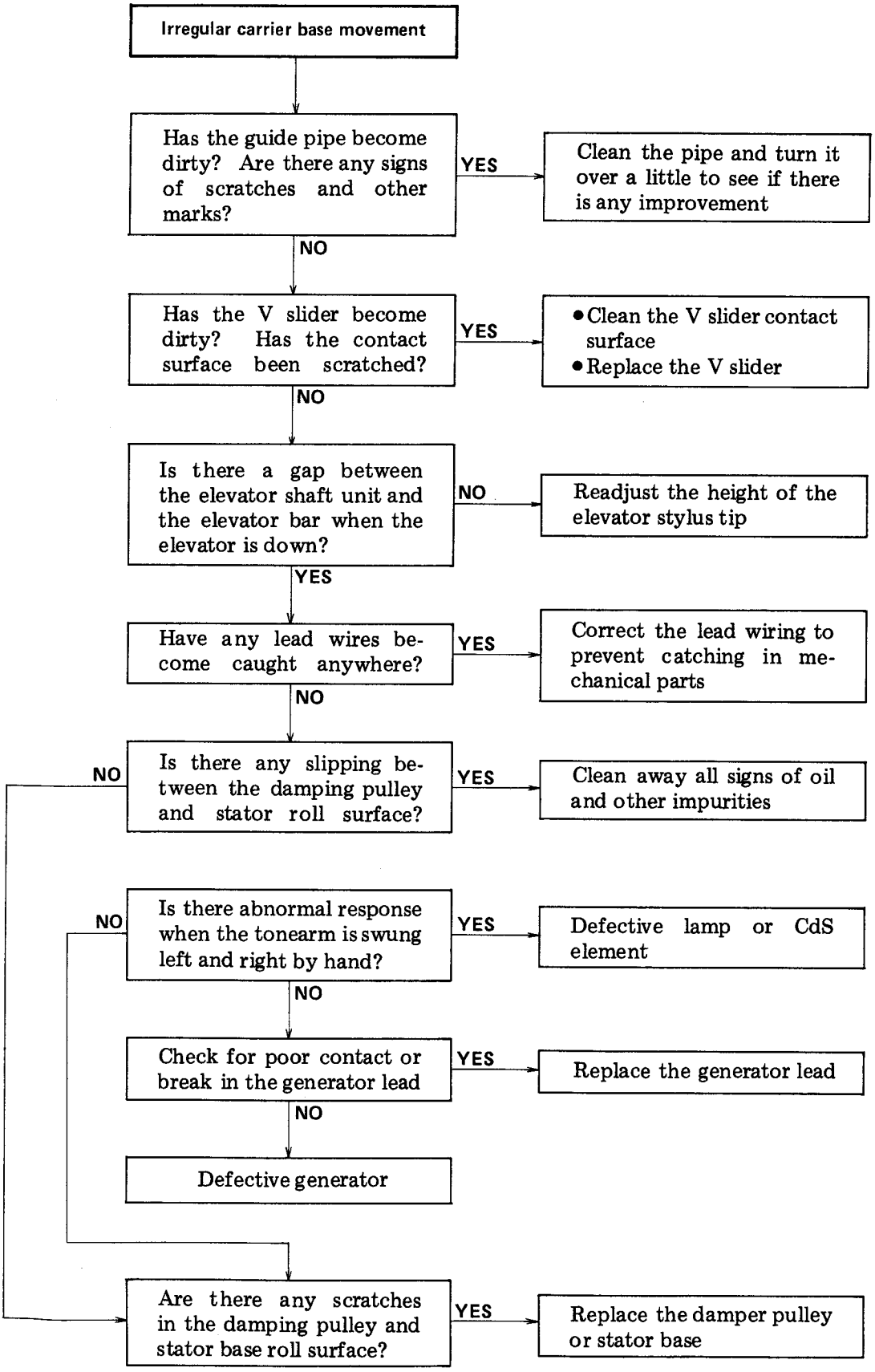
■ Timing Chart 2



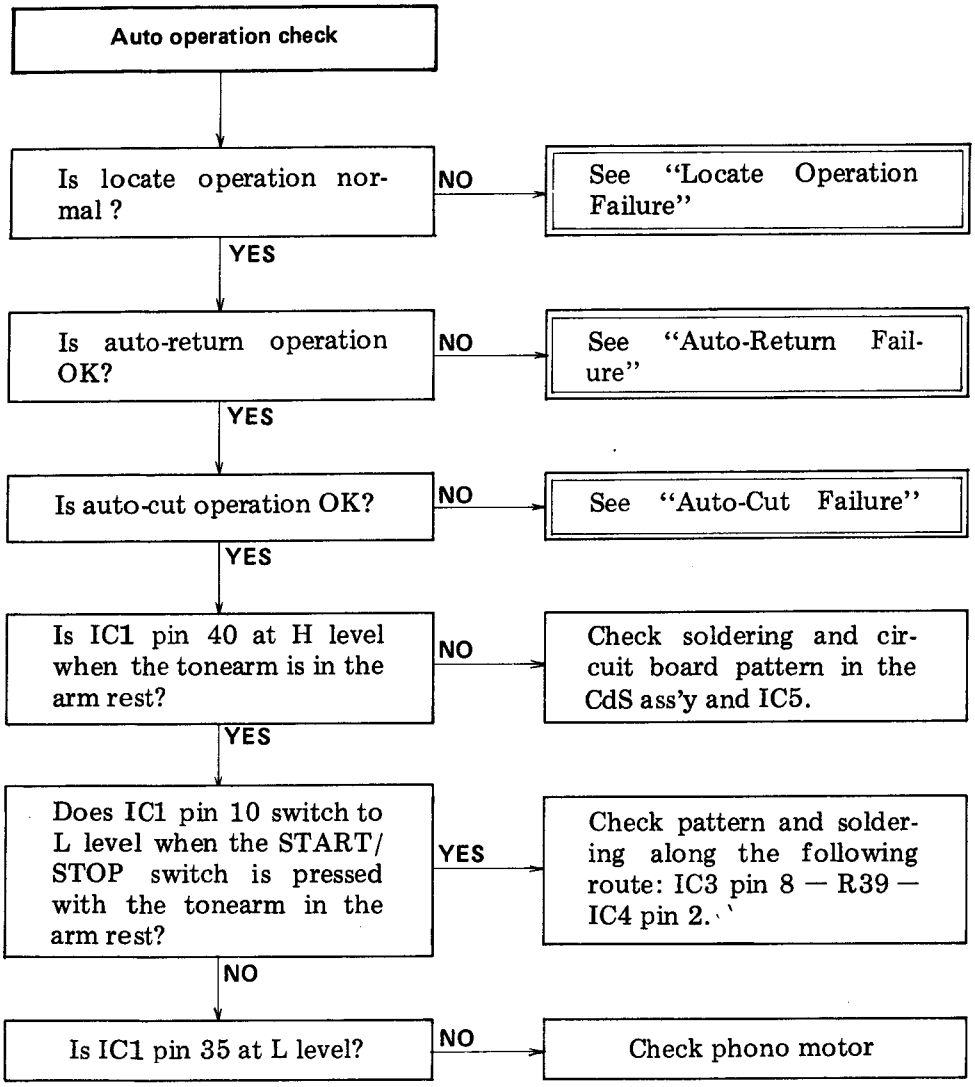
■ Generation of Howling



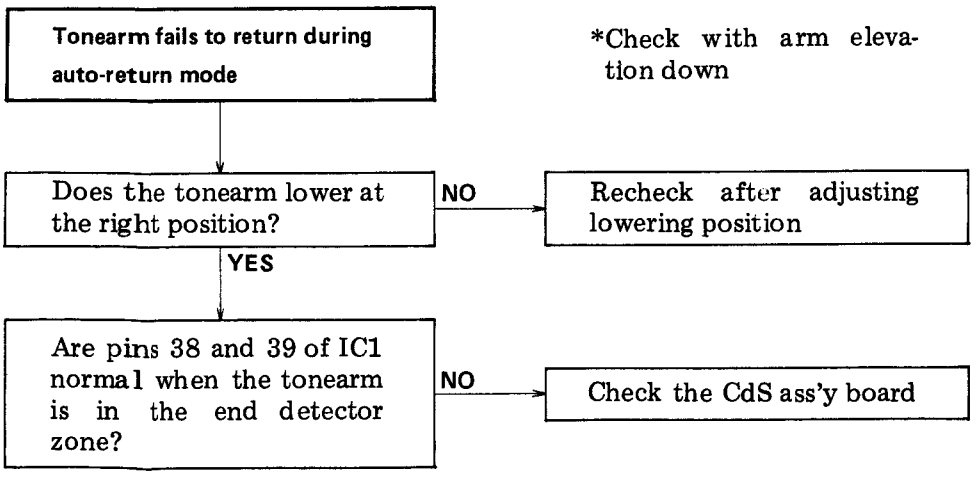
■ Irregular Carrier Base Movement


Irregular carrier base movement
Has the guide pipe become dirty? Are there any signs of scratches and other marks?
YES
Clean the pipe and turn it over a little to see if there is any improvement
NO
Has the V slider become dirty? Has the contact surface been scratched?
YES
• Clean the V slider contact surface
• Replace the V slider
NO
Is there a gap between the elevator shaft unit and the elevator bar when the elevator is down?
NO
Readjust the height of the elevator stylus tip
YES
Have any lead wires become caught anywhere?
YES
Correct the lead wiring to prevent catching in mechanical parts
NO
NO
Is there any slipping between the damping pulley and stator roll surface?
YES
Clean away all signs of oil and other impurities
NO
Is there abnormal response when the tonearm is swung left and right by hand?
YES
Defective lamp or CdS element
NO
Check for poor contact or break in the generator lead
YES
Replace the generator lead
NO
Defective generator
Are there any scratches in the damping pulley and stator base roll surface?
YES
Replace the damper pulley or stator base

■ Automatic Operations


Auto operation check
Is locate operation normal ?
NO
See "Locate Operation Failure"
YES
Is auto-return operation OK?
NO
See "Auto-Return Failure"
YES
Is auto-cut operation OK?
NO
See "Auto-Cut Failure"
YES
Is IC1 pin 40 at H level when the tonearm is in the arm rest?
NO
Check soldering and circuit board pattern in the CdS ass'y and IC5.
YES
Does IC1 pin 10 switch to L level when the START/STOP switch is pressed with the tonearm in the arm rest?
YES
Check pattern and soldering along the following route: IC3 pin 8 — R39 — IC4 pin 2.
NO
Is IC1 pin 35 at L level?
NO
Check phono motor

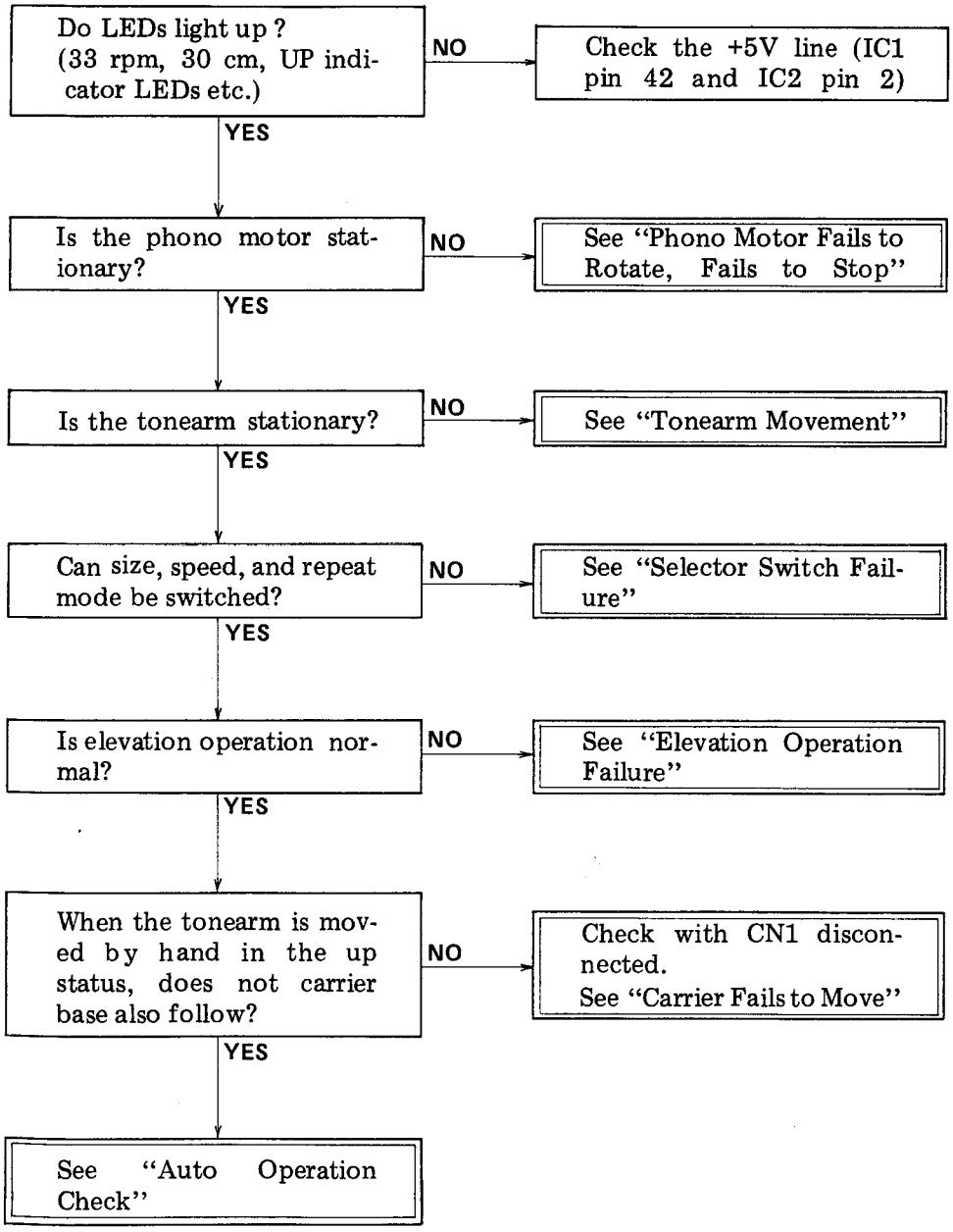
■ Auto-Return Failure


Tonearm fails to return during auto-return mode
*Check with arm elevation down
Does the tonearm lower at the right position?
NO
Recheck after adjusting lowering position
YES
Are pins 38 and 39 of IC1 normal when the tonearm is in the end detector zone?
NO
Check the CdS ass'y board

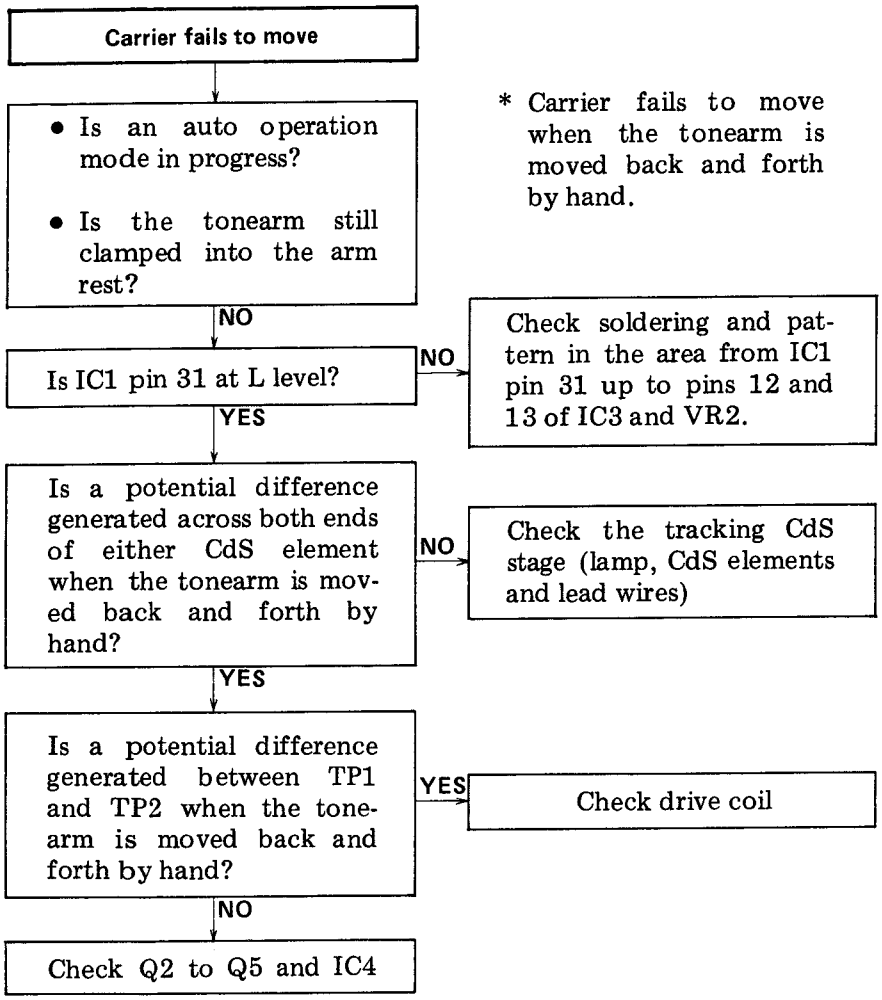
5.2 ELECTRICAL CHECKS

Place the tonearm in the arm rest, and switch the power on. Note that detailed troubleshooting guides are included for items enclosed in double frames.

■ **Operational Mode Checks**

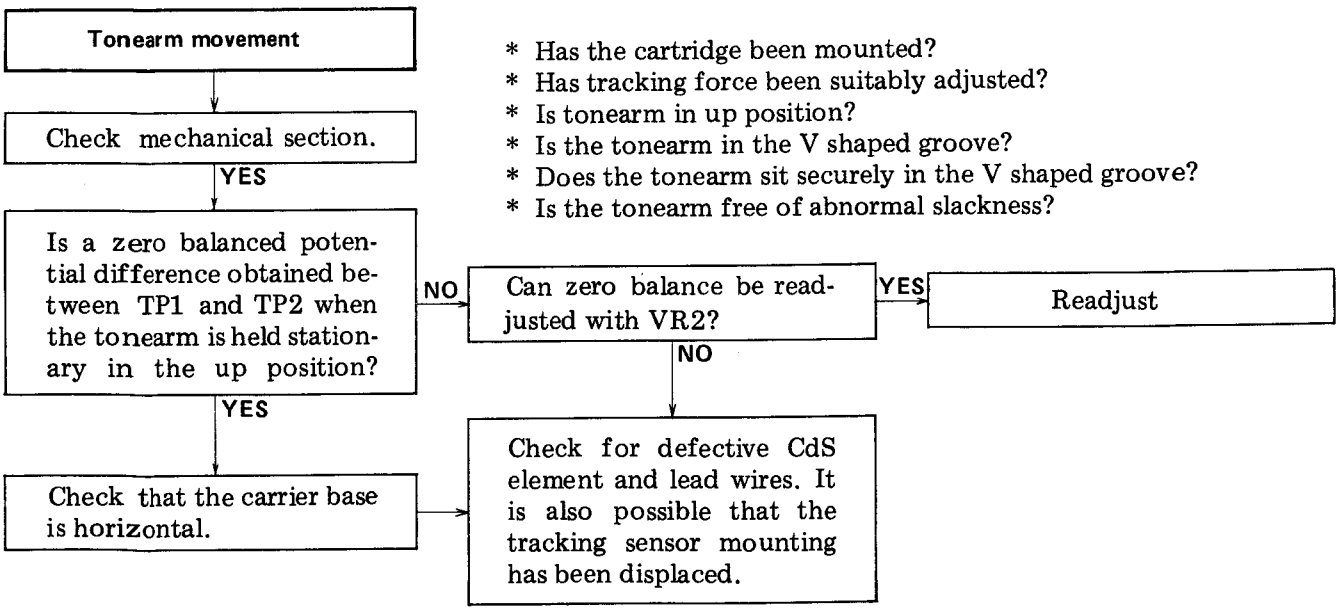

Do LEDs light up ? (33 rpm, 30 cm, UP indicator LEDs etc.)
NO
Check the +5V line (IC1 pin 42 and IC2 pin 2)
YES
Is the phono motor stationary?
NO
See "Phono Motor Fails to Rotate, Fails to Stop"
YES
Is the tonearm stationary?
NO
See "Tonearm Movement"
YES
Can size, speed, and repeat mode be switched?
NO
See "Selector Switch Failure"
YES
Is elevation operation normal?
NO
See "Elevation Operation Failure"
YES
When the tonearm is moved by hand in the up status, does not carrier base also follow?
NO
Check with CN1 disconnected.
See "Carrier Fails to Move"
YES
See "Auto Operation Check"

■ Carrier Fails to Move


Carrier fails to move
• Is an auto operation mode in progress?
• Is the tonearm still clamped into the arm rest?
NO
Is IC1 pin 31 at L level?
NO
Check soldering and pattern in the area from IC1 pin 31 up to pins 12 and 13 of IC3 and VR2.
YES
Is a potential difference generated across both ends of either CdS element when the tonearm is moved back and forth by hand?
NO
Check the tracking CdS stage (lamp, CdS elements and lead wires)
YES
Is a potential difference generated between TP1 and TP2 when the tonearm is moved back and forth by hand?
YES
Check drive coil
NO
Check Q2 to Q5 and IC4

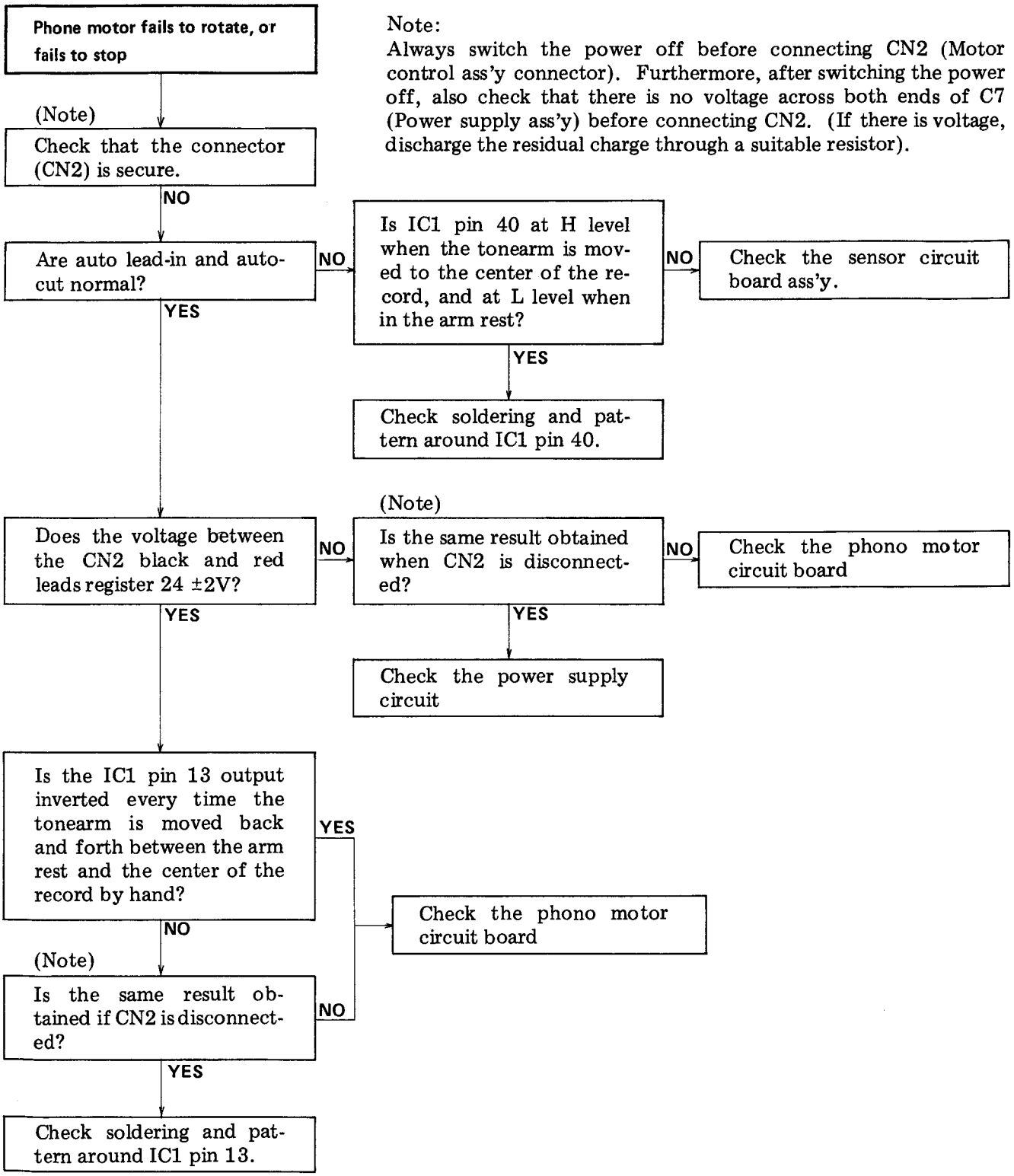
* Carrier fails to move when the tonearm is moved back and forth by hand.

■ Tonearm Movement


Tonearm movement
Check mechanical section.
YES
Is a zero balanced potential difference obtained between TP1 and TP2 when the tonearm is held stationary in the up position?
NO
Can zero balance be readjusted with VR2?
YES
Readjust
NO
YES
Check that the carrier base is horizontal.
Check for defective CdS element and lead wires. It is also possible that the tracking sensor mounting has been displaced.

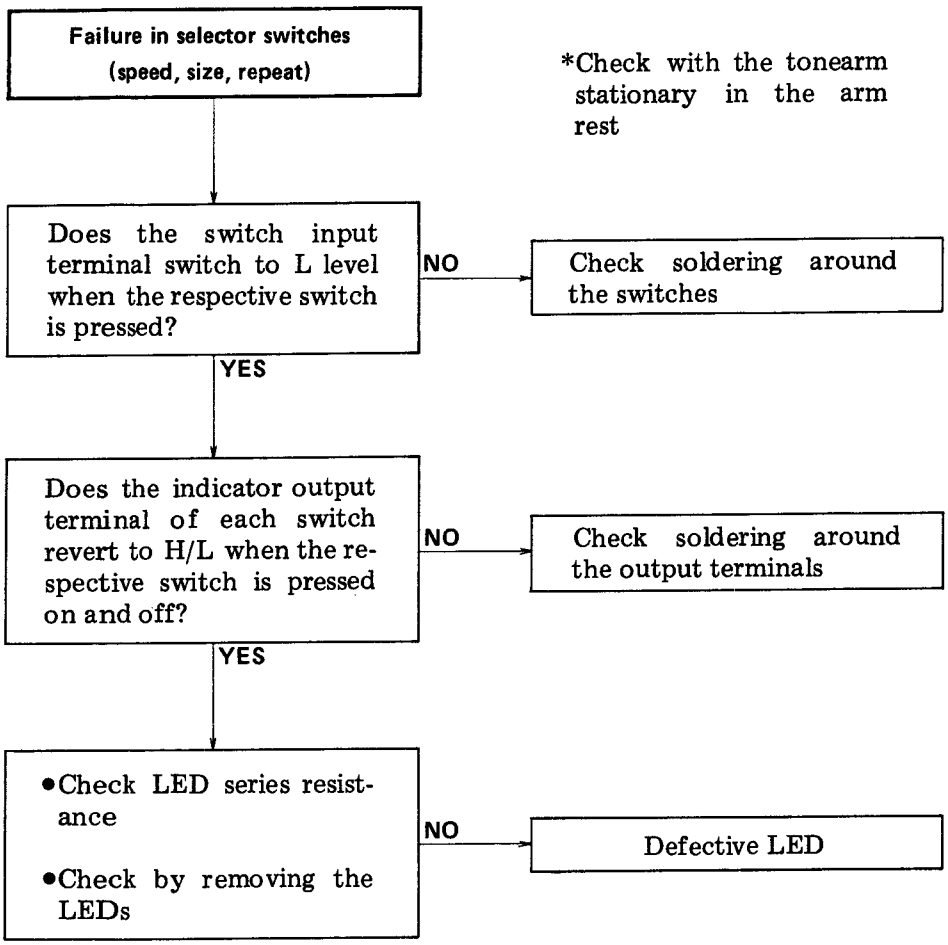
* Has the cartridge been mounted?
* Has tracking force been suitably adjusted?
* Is tonearm in up position?
* Is the tonearm in the V shaped groove?
* Does the tonearm sit securely in the V shaped groove?
* Is the tonearm free of abnormal slackness?

■ Phono Motor Fails to Rotate, Fails to Stop


Phone motor fails to rotate, or fails to stop
(Note)
Check that the connector (CN2) is secure.
NO
Are auto lead-in and auto-cut normal?
NO
Is IC1 pin 40 at H level when the tonearm is moved to the center of the record, and at L level when in the arm rest?
NO
Check the sensor circuit board ass'y.
YES
Check soldering and pattern around IC1 pin 40.
YES
(Note)
Does the voltage between the CN2 black and red leads register 24 ±2V?
NO
Is the same result obtained when CN2 is disconnected?
NO
Check the phono motor circuit board
YES
Check the power supply circuit
YES
Is the IC1 pin 13 output inverted every time the tonearm is moved back and forth between the arm rest and the center of the record by hand?
YES
Check the phono motor circuit board
NO
(Note)
Is the same result obtained if CN2 is disconnected?
NO
YES
Check soldering and pattern around IC1 pin 13.

Note:
Always switch the power off before connecting CN2 (Motor control ass'y connector). Furthermore, after switching the power off, also check that there is no voltage across both ends of C7 (Power supply ass'y) before connecting CN2. (If there is voltage, discharge the residual charge through a suitable resistor).

■ Selector Switch Failure

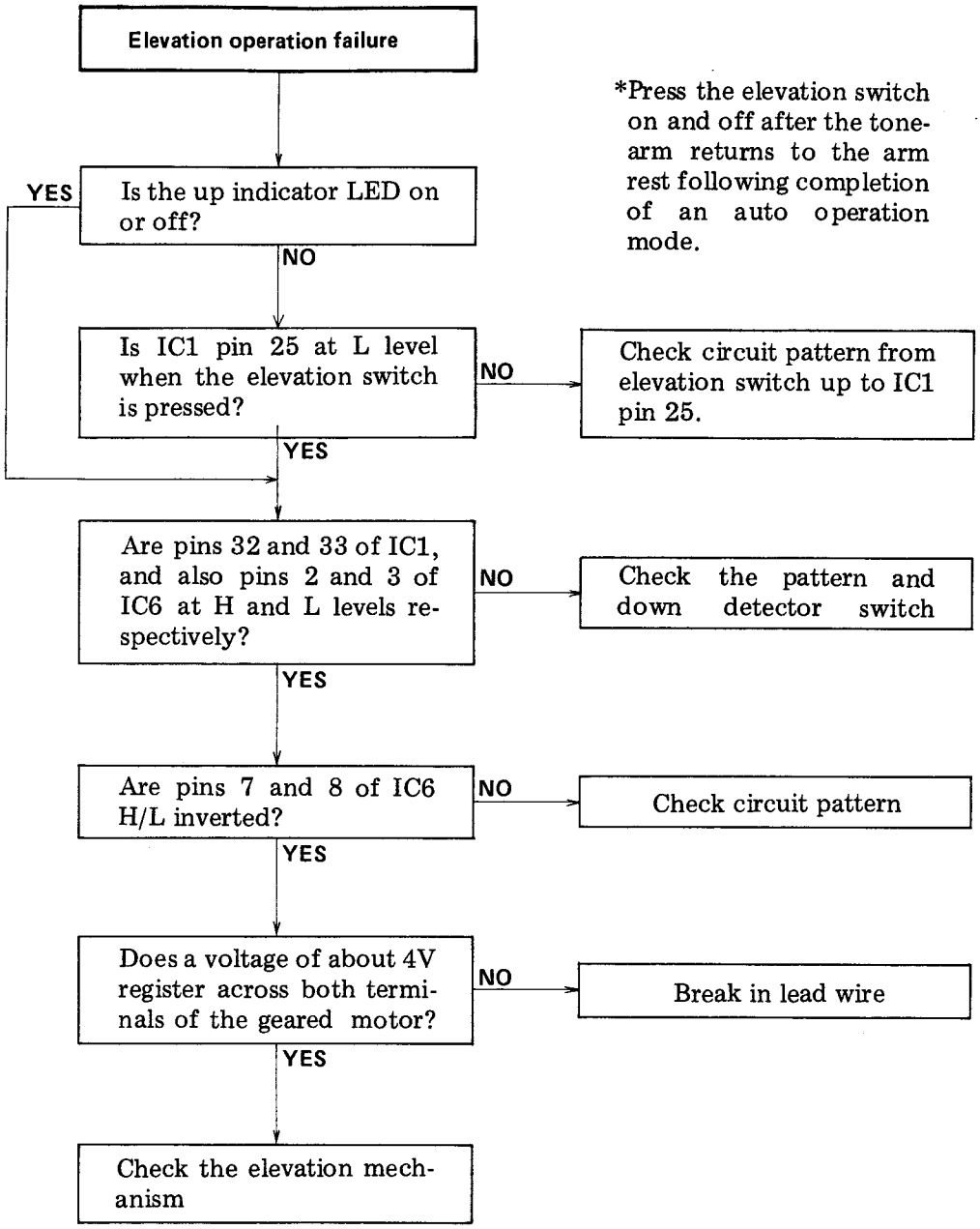

Failure in selector switches (speed, size, repeat)
*Check with the tonearm stationary in the arm rest
Does the switch input terminal switch to L level when the respective switch is pressed?
NO
Check soldering around the switches
YES
Does the indicator output terminal of each switch revert to H/L when the respective switch is pressed on and off?
NO
Check soldering around the output terminals
YES
•Check LED series resistance
•Check by removing the LEDs
NO
Defective LED

■ Locate Operation Failure

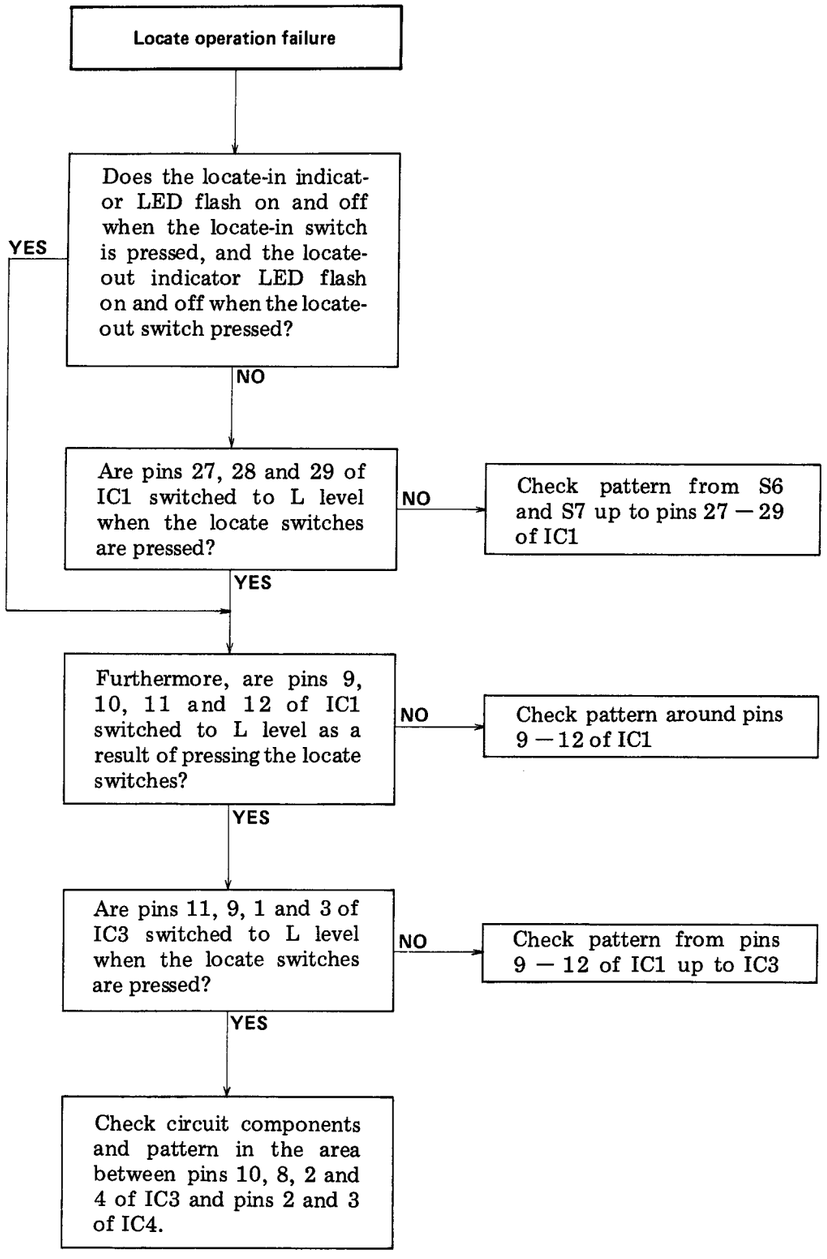
- **During locate operations, the IC pin levels should change as shown in the following table.**

Locate-in switch (S6)	When pressed to 1st level	IC1 pin 28	L → IC1 pin 9 IC3 pin 11	L → Lead-in indicator LED L (D10) blinks on and off
	When pressed to 2nd level	IC1 pin 27 and 28	L → IC1 pin 10,9 IC3 pin 9,11	L → Lead-in indicator LED L (D10) flashes on and off
Locate-out switch (S7)	When pressed to 1st level	IC1 pin 29	L → IC1 pin 11 IC3 pin 1	L → Lead-out indicator LED L (D11) blinks on and off
	When pressed to 2nd level	IC1 pin 27 and 29	L → IC1 pin 12,11 IC3 pin 3,1	L → D11 flashes on and off L

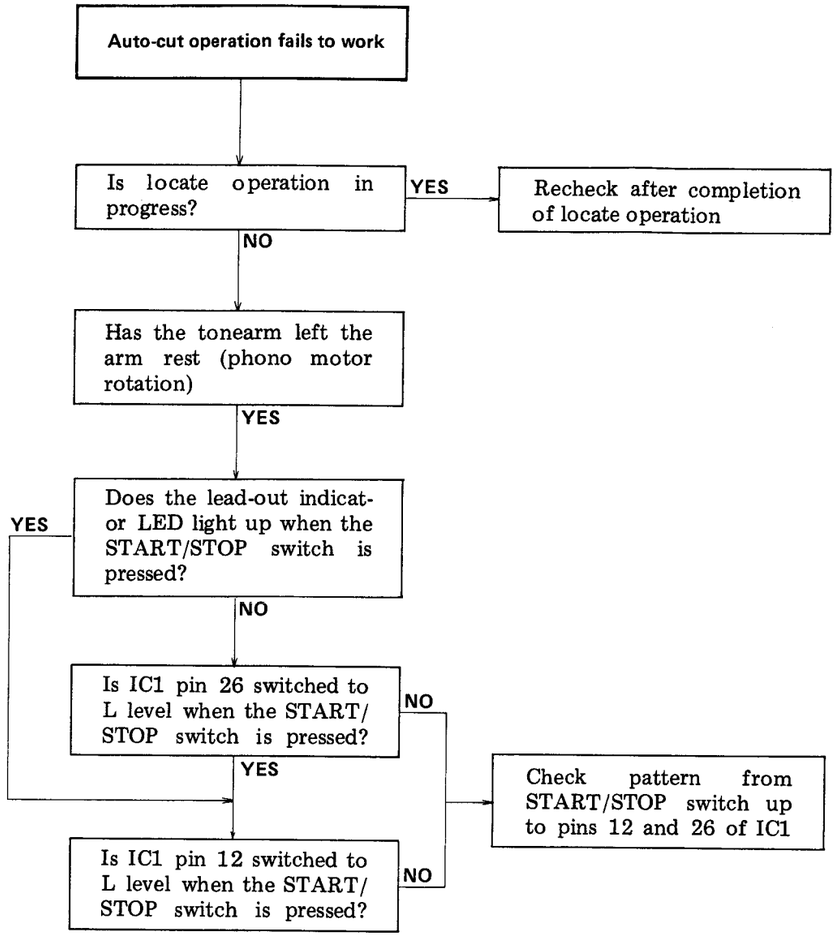
■ Elevation Operation Failure


Elevation operation failure
YES
Is the up indicator LED on or off?
NO
Is IC1 pin 25 at L level when the elevation switch is pressed?
NO
Check circuit pattern from elevation switch up to IC1 pin 25.
YES
Are pins 32 and 33 of IC1, and also pins 2 and 3 of IC6 at H and L levels respectively?
NO
Check the pattern and down detector switch
YES
Are pins 7 and 8 of IC6 H/L inverted?
NO
Check circuit pattern
YES
Does a voltage of about 4V register across both terminals of the geared motor?
NO
Break in lead wire
YES
Check the elevation mechanism

*Press the elevation switch on and off after the tone-arm returns to the arm rest following completion of an auto operation mode.

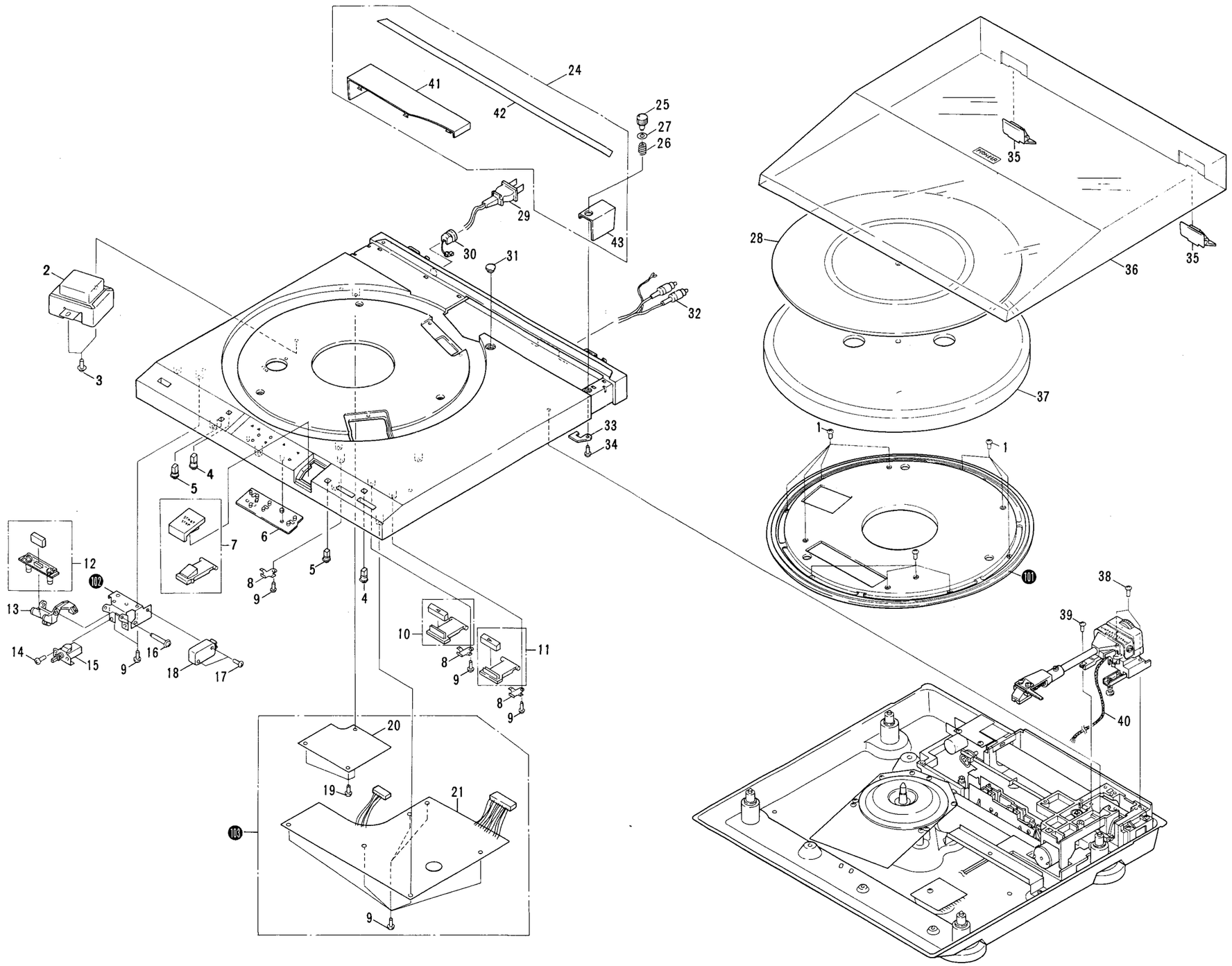

Locate operation failure
Does the locate-in indicator LED flash on and off when the locate-in switch is pressed, and the locate-out indicator LED flash on and off when the locate-out switch pressed?
YES
NO
Are pins 27, 28 and 29 of IC1 switched to L level when the locate switches are pressed?
NO
Check pattern from S6 and S7 up to pins 27 — 29 of IC1
YES
Furthermore, are pins 9, 10, 11 and 12 of IC1 switched to L level as a result of pressing the locate switches?
NO
Check pattern around pins 9 — 12 of IC1
YES
Are pins 11, 9, 1 and 3 of IC3 switched to L level when the locate switches are pressed?
NO
Check pattern from pins 9 — 12 of IC1 up to IC3
YES
Check circuit components and pattern in the area between pins 10, 8, 2 and 4 of IC3 and pins 2 and 3 of IC4.

■ Auto-Cut Failure


Auto-cut operation fails to work
Is locate operation in progress?
YES
Recheck after completion of locate operation
NO
Has the tonearm left the arm rest (phono motor rotation)
YES
Does the lead-out indicator LED light up when the START/STOP switch is pressed?
YES
NO
Is IC1 pin 26 switched to L level when the START/STOP switch is pressed?
NO
YES
Check pattern from START/STOP switch up to pins 12 and 26 of IC1
Is IC1 pin 12 switched to L level when the START/STOP switch is pressed?
NO

6. EXPLODED VIEWS

6.1 EXTERIOR 1



NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List

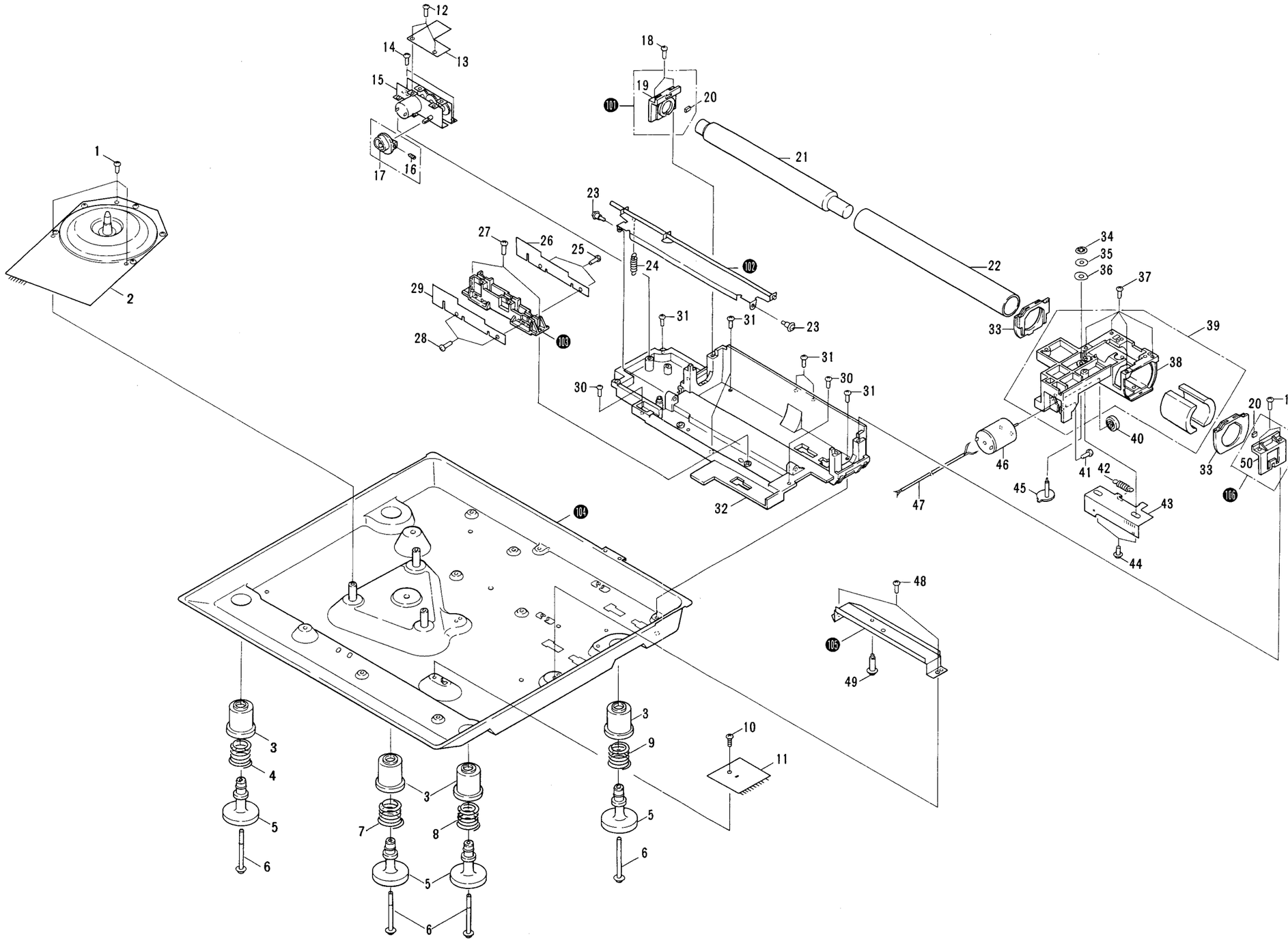
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	PPZ30P080FZK	Screw		101.		Top cover
⚠ ★	2.	PTT-128	Power transformer (120V)		102.		Switch base
	3.	PLZ40P120FMC	Screw		103.		Schematic board unit
	4.	PAC-073	Push button (A)				
	5.	PAC-074	Push button (B)				
	6.	PNX-256	Lens				
	7.	PAD-075	Start button unit				
	8.	PBK-047	Spring				
	9.	PPZ30P100FMC	Screw				
	10.	PAD-076	Button unit (F)				
	11.	PAD-077	Button unit (R)				
	12.	PAD-078	Power button unit				
	13.	PNX-182	Switch lever				
	14.	IDZ30P060FMC	Screw				
★★	15.	PSG-017	Push switch				
	16.	PBA-117	Screw				
	17.	PMA30P150FMC	Screw				
⚠ ★★	18.	PSF-018	Microswitch				
	19.	IPZ30P080FMC	Screw				
⚠	20.	XWR-010	Power supply assembly				
	21.	XWM-058	Control assembly				
	22.	・・・					
	23.	・・・					
	24.	PXB-233	Panel assembly				
	25.	PNX-257	Cramp knob				
	26.	PBH-288	Cramp spring				
	27.	WA52D080D025	Screw				
	28.	PEA-052	Rubber mat assemby.				
⚠	29.	PDG-023	Power cord				
	30.	PEC-058	Strain releif				
	31.	PEB-192	Rubber bush				
	32.	PDE-073	PU cord				
	33.	PNX-258	Cramp lever				
	34.	VTZ30P080FMC	Screw				
★	35.	PXB-201	Hinge assembly				
★★	36.	PNV-039	Dust cover				
	37.	PNR-144	Turntable platter				
	38.	PPZ30P100FZK	Screw				
	39.	IPZ30P080FMC	Screw				
	40.	PDA-018	Sealed tube assembly				
	41.	PAM-072	Panel name plate (A)				
	42.	PAM-080	Sheet				
	43.	PAM-073	Panel name plate (B)				

6.2 EXTERIOR 2

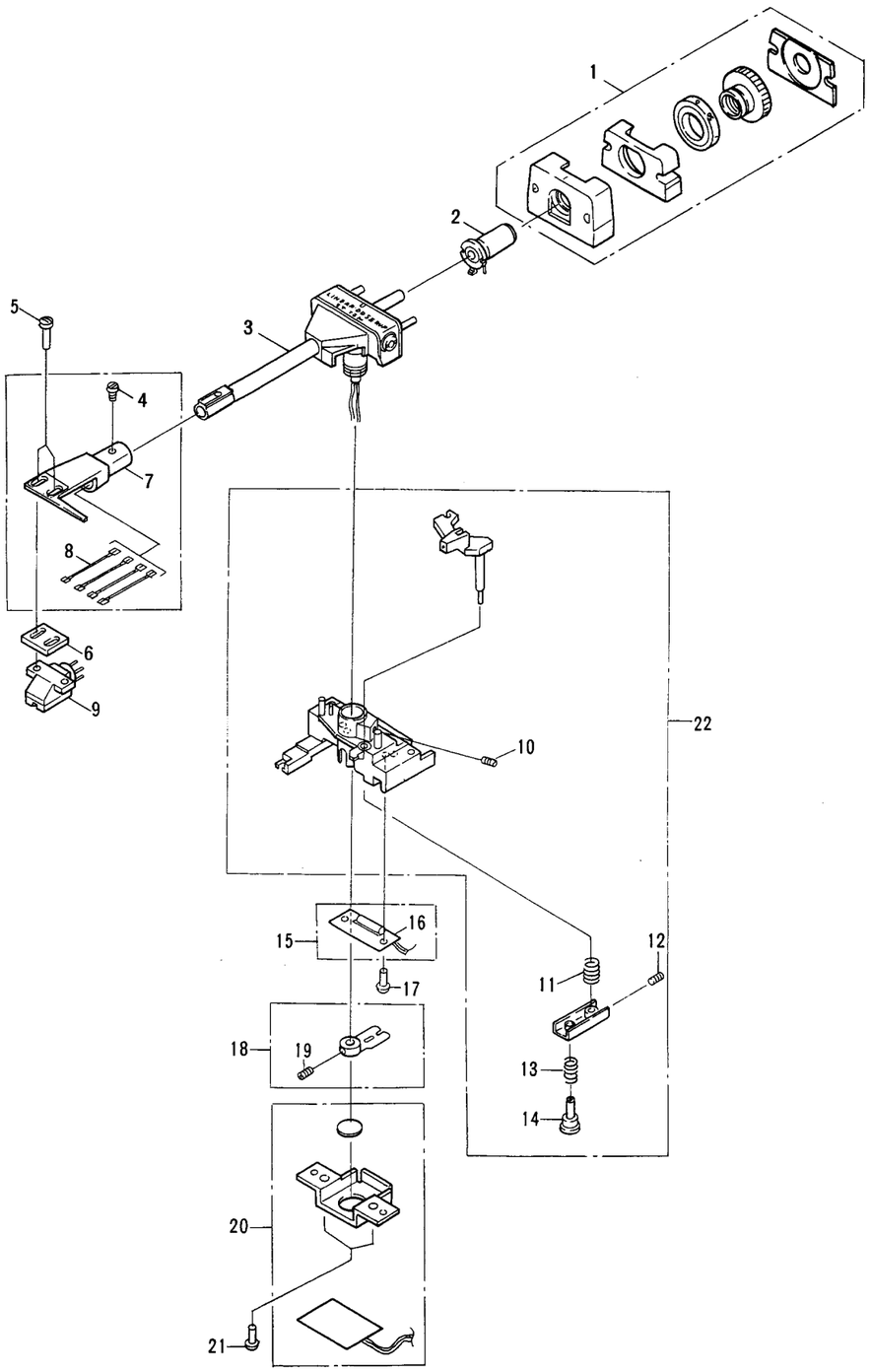
Parts List

Mark	No.	Part No.	Description
	1.	PMA30P080FMC	Screw
★★	2.	PXM-093	Motor
	3.	PEB-197	Damper cushion
	4.	PBH-304	Spring
	5.	PNX-190	Holder
	6.	PBA-118	Screw
	7.	PBH-305	Spring
	8.	PBH-282	Spring
	9.	PBH-305	Spring
	10.	PDZ30P080FMC	Screw
	11.	XWX-067	Connection assembly
	12.	PDZ30P080FMC	Screw
	13.	XWX-066	Elevation assembly
	14.	IPZ30P080FMC	Screw
★★	15.	PXM-096	Gear motor
	16.	ZMD30H060FBT	Screw
	17.	PNX-247	EV cam
	18.	PPZ30P100FZK	Screw
	19.	PNX-249	Pipe guide
	20.	PEB-171	Rubber pad
	21.	PXB-212	Coil assembly
	22.	PLB-100	Guide pipe
	23.	PBA-122	Screw
	24.	PBH-306	EV plate spring
	25.	PPZ30P100FMC	Screw
	26.	XWX-062	Photo transistor assembly
	27.	PPZ30P080FMC	Screw
	28.	IDZ30P060FMC	Screw
	29.	XWX-063	LED assembly
	30.	PDZ30P080FMC	Screw
	31.	PDZ30P060FZK	Screw
	32.	PNX-246	Stator base
	33.	PNX-264	V slider
	34.	YS40FBT	E-type washer
	35.	WC40FMC	Plate washer
	36.	PBE-019	PU spring washer
	37.	PPZ30P100FZK	Screw
	38.	PNX-260	Carrier base (B)
	39.	PYY-104	Carrier base (B) unit
	40.	PNX-360	Stemming pulley
	41.	PMZ26P040FCR	Screw
	42.	PBH-224	Start spring
	43.	PNC-204	Sensor shutter
	44.	IPZ30P100FMC	Screw
	45.	PNW-592	Adjusting cam
	46.	PXM-101	Dynamo
	47.	PDA-020	Lead
	48.	IDZ30P060FMC	Screw
	49.	PBA-104	Screw
	50.	PNX-345	Pipe guide
	51.		
	101.		Pipe guide unit
	102.		EV plate unit
	103.		Sensor holder
	104.		Under base
	105.		Angle
	106.		Pipe guide unit

Exterior 2


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
101
102
103
104
105
106

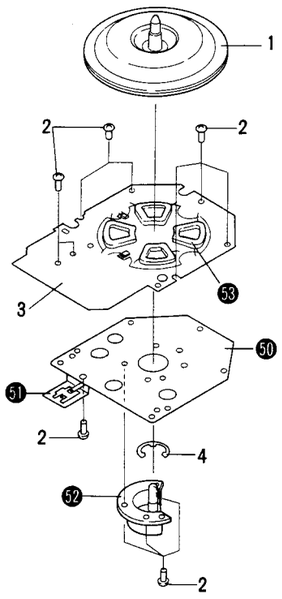
6.3 TONEARM



Parts List

Mark	No.	Part No.	Description
★	1.	PXA-893	Weight assembly
	2.	PXA-891	Weight shaft assembly
★	3.	PPD-619	Tonearm assembly
	4.	PBA-533	Screw
	5.	PBA-905	Screw
	6.	PXT-447	Shell spacer unit
	7.	PXA-881	Headsheel assembly
	8.	PDF-542	Terminal chip unit
	9.	PPB-935	Cartridge assembly
	10.	ZMD40H080FBT	Screw
	11.	PBH-289	EV spring
	12.	ZMD30H030FBT	Screw
	13.	PBH-290	Adjusting spring
	14.	PNX-262	Adjusting screw
	15.	XWX-064	Lamp assembly
★★	16.	PEL-041	Lamp
	17.	PLZ26P080FMC	Screw
	18.	PXT-440	Tracking shutter
	19.	ZMK30H030FNI	Screw
	20.	XWX-065	CdS assembly
	21.	PPZ30P100FMC	Screw
	22.	PXB-234	Carrier base (A) assembly

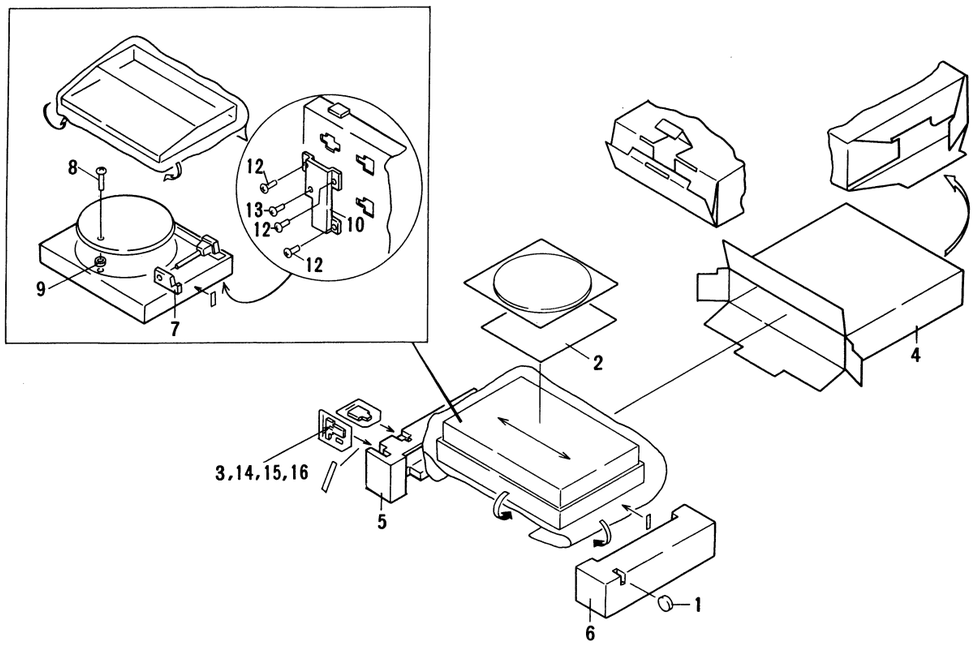
6.4 MOTOR ASSEMBLY



Parts List

Mark	No.	Part No.	Description
	1.	PXT-458	Rotor unit
	2.	PSZ30P050FMC	Screw
	3.	PWM-063	Control assembly
	4.		E ring (ETW-12)
	50.		Base unit
	51.		Heat sink
	52.		Shaft holder
	53.		Coil

7. PACKING



Parts List

Mark	No.	Part No.	Description
	1.	N93-603	45 adaptor
	2.	PRB-186	Operating instructions
	3.	PNX-296	Shell spacer
	4.	PHG-436	Packing case
	5.	PHA-125	Protector (L)
	6.	PHA-126	Protector (R)
	7.	PHA-131	Tonarm protector
	8.	PBA-100	Screw
	9.	PNX-294	Turntable platter packing
	10.	PNX-252	Carrier holder
	11.	....	
	12.	PPZ30P150FMC	Screw
	13.	IAZ30 P080FMC	Screw
	14.	PBA-536	Screw
	15.	PBN-902	Nut
	16.	B23-642	Washer

8. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561 .....*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473 .....*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*	*.....*	*RN2H 0 R 5 K*
1Ω	*010*	*.....*	*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621 ....*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

CONTROL UNIT (XWM-058)

SWITCHES

Mark	Part No.	Symbol & Description	
★★	PSG-025	S1—S5	Switch
★★	PSG-030	S6,S7	Switch

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 16L (CEA 100M 50L)	C8,C16
	CEA 220M 10L CEA 220M 25L)	C9
	CEA 100M 25L (CEA 100M 35L) (CEA 100M 50L)	C13,C14
	CEA R47M 50NP (CEA R47M 100NP)	C20
	CEA 101M 6.3L (CEA 101M 10L)	C21
	CEA R15M 50	C22,C23
	CEA 4R7M 25L (CEA 4R7M 35L) (CEA 4R7M 50L)	C24

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	PCP-032 (PCP-022)	VR2	Semi-fixed
★	PCP-060 (PCP-061)	VR3,VR4	Semi-fixed
	RGSD5X472J	R4	
	RGSD12X472J	R5	
	RN1/4PR1211F	R22,R23	
	RD1/4PM □□□J	R2,R3,R6—R21,R25—R46	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PD6005	IC1
★★	M53207P	IC3
★★	MB3614 (μPC324C)	IC4
★★	MB84069B (TC4069UBP)	IC5
★★	BA6208	IC6
★★	2SA816 (2SA671)	Q2,Q3
★★	2SC1626 (2SC1061)	Q4,Q5
★★	2SC1815 (2SC945)	Q6
★	1S2473 (1S1555)	D4,D5
★	PR5524S	D9—D11,D15
★	BG5524S	D7,D8,D12—14

OTHERS

Mark	Part No.	Symbol & Description
★	KMFC1033S	Ceramic
	PNX-253	LED Holder
	PDE-098	Connector assembly
	PDE-099	Connector assembly

PHOTO TRANSISTOR ASSEMBLY (XWX-062)

Mark	Part No.	Symbol & Description
★	PH101	Q51—Q53

LED ASSEMBLY (XWX-063)

Mark	Part No.	Symbol & Description
★	TLR121	D51—D53
	RGSD4X561J	R51

8. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561 .....*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473 .....*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*	*.....*	*RN2H 0 R 5 K*
1Ω	*010*	*.....*	*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621 ....*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

CONTROL UNIT (XWM-058)

SWITCHES

Mark	Part No.	Symbol & Description	
★★	PSG-025	S1–S5	Switch
★★	PSG-030	S6,S7	Switch

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 16L (CEA 100M 50L)	C8,C16
	CEA 220M 10L CEA 220M 25L)	C9
	CEA 100M 25L (CEA 100M 35L) (CEA 100M 50L)	C13,C14
	CEA R47M 50NP (CEA R47M 100NP)	C20
	CEA 101M 6.3L (CEA 101M 10L)	C21
	CEA R15M 50	C22,C23
	CEA 4R7M 25L (CEA 4R7M 35L) (CEA 4R7M 50L)	C24

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	PCP-032 (PCP-022)	VR2	Semi-fixed
★	PCP-060 (PCP-061)	VR3,VR4	Semi-fixed
	RGSD5X472J	R4	
	RGSD12X472J	R5	
	RN1/4PR1211F	R22,R23	
	RD1/4PM □□□J	R2,R3,R6–R21,R25–R46	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PD6005	IC1
★★	M53207P	IC3
★★	MB3614 (μPC324C)	IC4
★★	MB84069B (TC4069UBP)	IC5
★★	BA6208	IC6
★★	2SA816 (2SA671)	Q2,Q3
★★	2SC1626 (2SC1061)	Q4,Q5
★★	2SC1815 (2SC945)	Q6
★	1S2473 (1S1555)	D4,D5
★	PR5524S	D9–D11,D15
★	BG5524S	D7,D8,D12–14

OTHERS

Mark	Part No.	Symbol & Description
★	KMFC1033S	Ceramic
	PNX-253	LED Holder
	PDE-098	Connector assembly
	PDE-099	Connector assembly

PHOTO TRANSISTOR ASSEMBLY (XWX-062)

Mark	Part No.	Symbol & Description
★	PH101	Q51–Q53

LED ASSEMBLY (XWX-063)

Mark	Part No.	Symbol & Description
★	TLR121	D51–D53
	RGSD4X561J	R51

LAMP ASSEMBLY (XWX-064)

Mark	Part No.	Symbol & Description	
★★	PEL-041	Lamp	8V 70 mA

CONTROL ASSEMBLY (PWM-063)

Mark	Part No.	Symbol & Description
	CCDCH 330J 50	C1
	CQMA 123K 50	C5
	CQMA 473K 50	C8
	CKDYF 103Z 50	C2,C4,C10,C23
	CKDYF 203Z 50	C11,C13,C25,C26
	CKDYF 104Z 50	C6,C7
	CCDCH 560J 50	C3
	CEA R47P 50 (CEA R47M 50L)	C9,C15
	CEA 100P 16 (CEA 100M 50L)	C24
	CEA 100P 35 (CEA 100M 50L)	C18–C22
	CEA 101P 10 (CEA 101M 10L)	C12
	CEA 010P 50 (CEA 010M 50L)	C27,C28
	CEA 330P 10 (CEA 330M 16L)	C29
	CEANL R22M 50 (CSZA R22M 35) (CSYA R22M 50)	C14
	CSZA R22M 35 (CSYA R22M 50)	C16

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	PCP-052	VR1, VR2	Semi-fixed 47k (B)
	RN1/4PR363G (RN1/4PR3572G) (RN1/4PR3652G)	R3	
	RN1PF2R2J	R10	
	RD1/4PM □□□J	R1,R2,R5–R9,R11–R17	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PA2007	IC1
★★	PA2008	IC2
★★	PD1003	IC3
★★	TD62503P	IC4
★★	2SC1815 (2SC945)	Q1
★	1S2473	D1

OTHERS

Mark	Part No.	Symbol & Description	
★	PSS-003	Crystal	
★	PCX-039	Hole element	HA, HB
	PXT-457	Rotor unit	

ELEVATION ASSEMBLY (XWX-066)

Mark	Part No.	Symbol & Description	
★★	PSG-031	S8, S9	Switch

POWER SUPPLY UNIT (XWR-010)

CAPACITORS

Mark	Part No.	Symbol & Description
	PCL-036	C1
	CEA 471M 50L	C2
	CEA 101M 35L	C3
	CEA 471M 25L	C4
	CEA 1R0M 50	C5
	CEA100M 35L	C7

RESISTOR

Mark	Part No.	Symbol & Description
	RS/HSFB222JL	R1

SEMICONDUCTORS

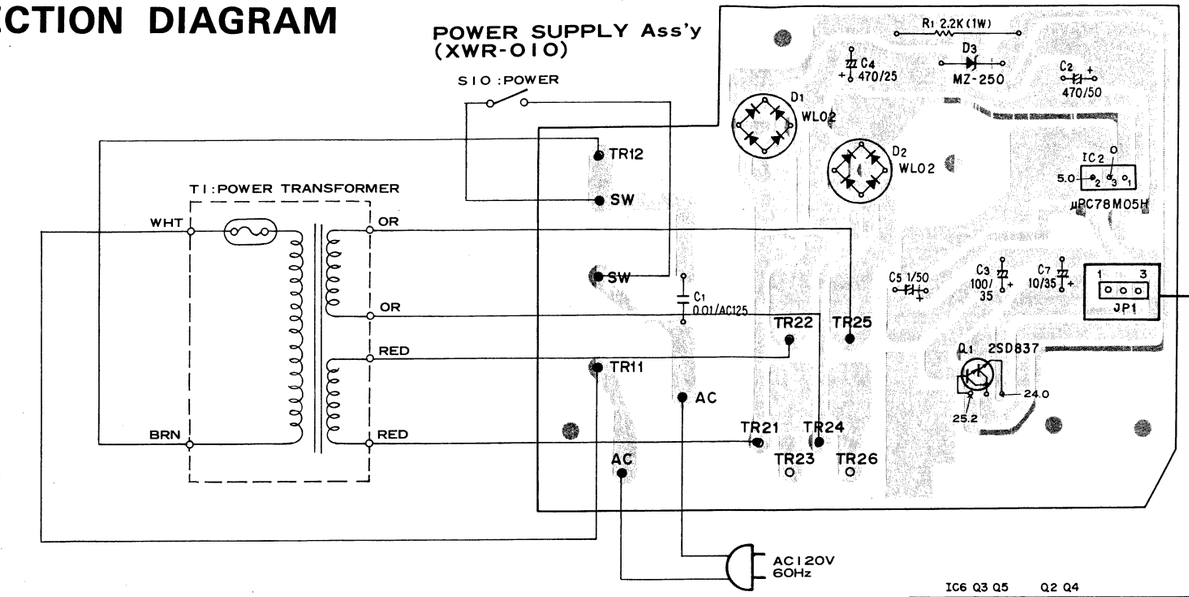
Mark	Part No.	Symbol & Description
★★	μPC78M05H	IC2
★★	2SD837	Q1
★	WL02 (PCX-010)	D1, D2
★	MZ-250 (WZ-250)	D3

OTHERS

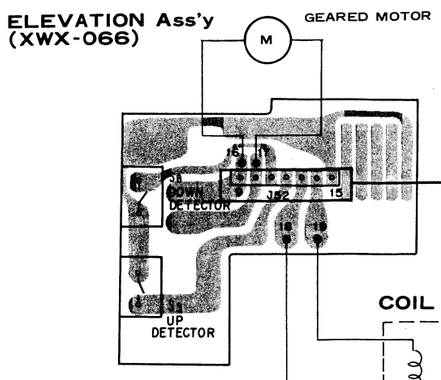
Mark	Part No.	Symbol & Description
	VBZ30P060FMC	Screw
	PMA30P060FMC	Screw

9. P.C.BOARDS CONNECTION DIAGRAM

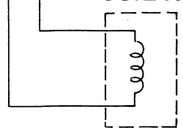
POWER SUPPLY Ass'y (XWR-010)



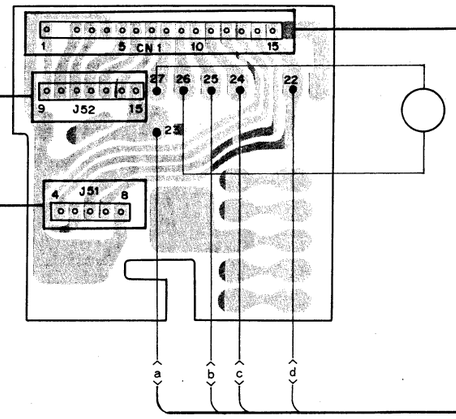
ELEVATION Ass'y (XWX-066)



COIL Ass'y



CONNECTOR Ass'y(XWX-067)



CONTROL Ass'y(XWM-058)

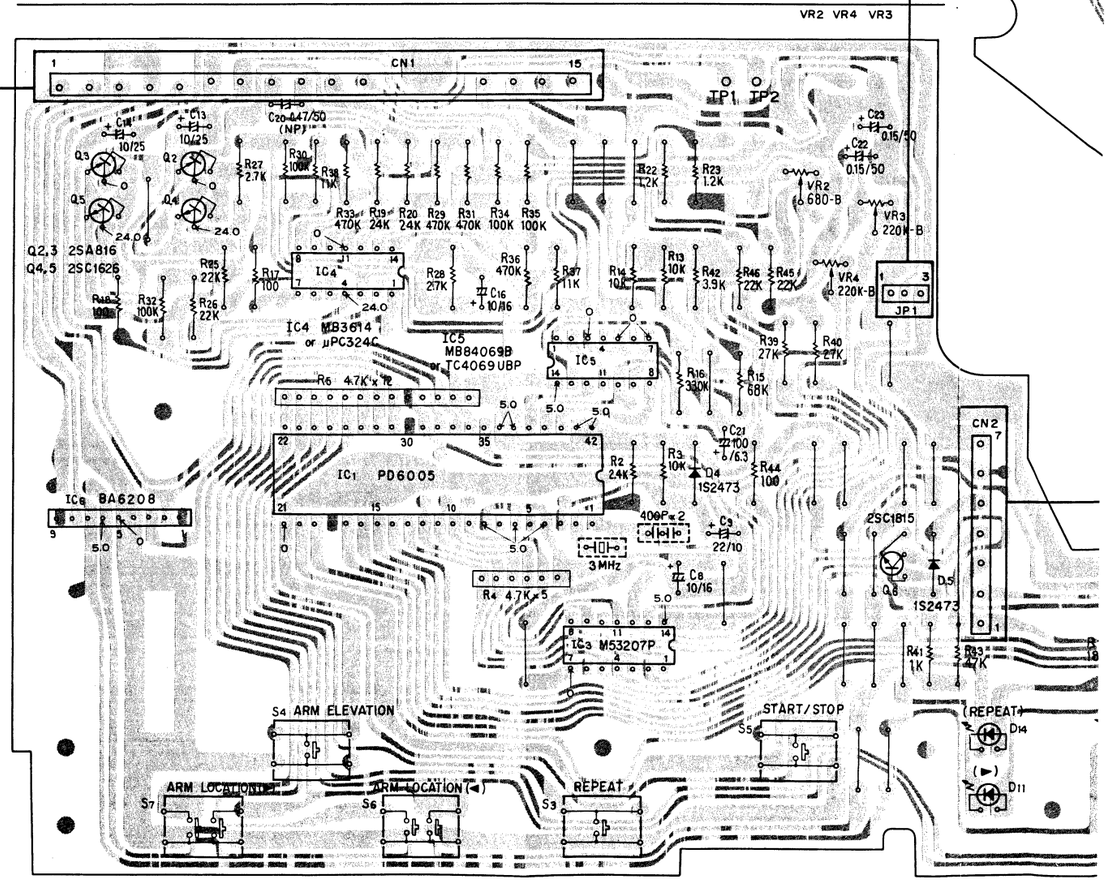
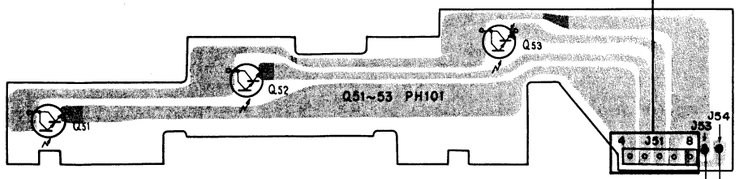
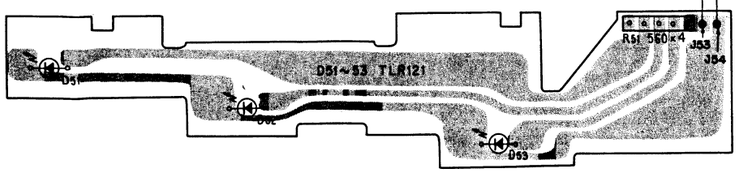


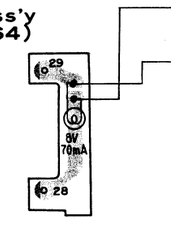
PHOTO TRANSISTOR Ass'y(XWX-062)



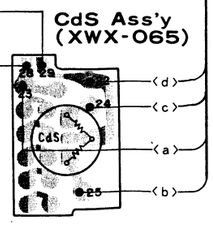
LED Ass'y(XWX-063)



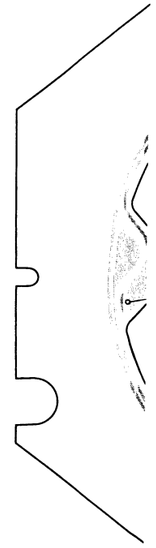
LAMP Ass'y (XWX-064)



CdS Ass'y (XWX-065)



MOTOR CON



4 5 6 7 8 9

Ass'y

R1 2.2K(1W)
D3 MZ-250
C4 470/25
C2 470/50
D1 WL02
D2 WL02
IC2 μPC78M05H
C1 0.01/AC125
C5 1/50
C3 100/35
C7 10/35
JP1
Q1 2SD837
TR22 TR25
TR21 TR24 TR23 TR26
AC
AC120V 60Hz

MOTOR CONTROL Ass'y (PXM-093)

IC2 IC1 IC4 IC3 Q1 VR1 VR2

Q1 2SC1815 or 2SC945
X'TAL
LA
LB
HB
HA
IC1 PA2007
IC3 PD1003
IC2 PA2009
IC4 TD62503P
TP1 TP2
D1 1S2473
CN2

A

B

(WX-067)

CONTROL Ass'y(XWM-058)

IC6 Q3 Q5 Q2 Q4 IC4 IC1 IC5 IC3 VR2 VR4 VR3

CN1
IC1 PD6005
IC4 MB3614 or μPC324C
IC5 MB84069B or TC4069UBP
IC6 BA6208
IC3 M53207P
Q2,3 2SA816
Q4,5 2SC1626
TP1 TP2
D4 1S2473
D5 1S2473
2SC1815
3MHz
VR2 680-B
VR3 220K-B
VR4 220K-B
JP1
CN2

CdS Ass'y (XWX-065)

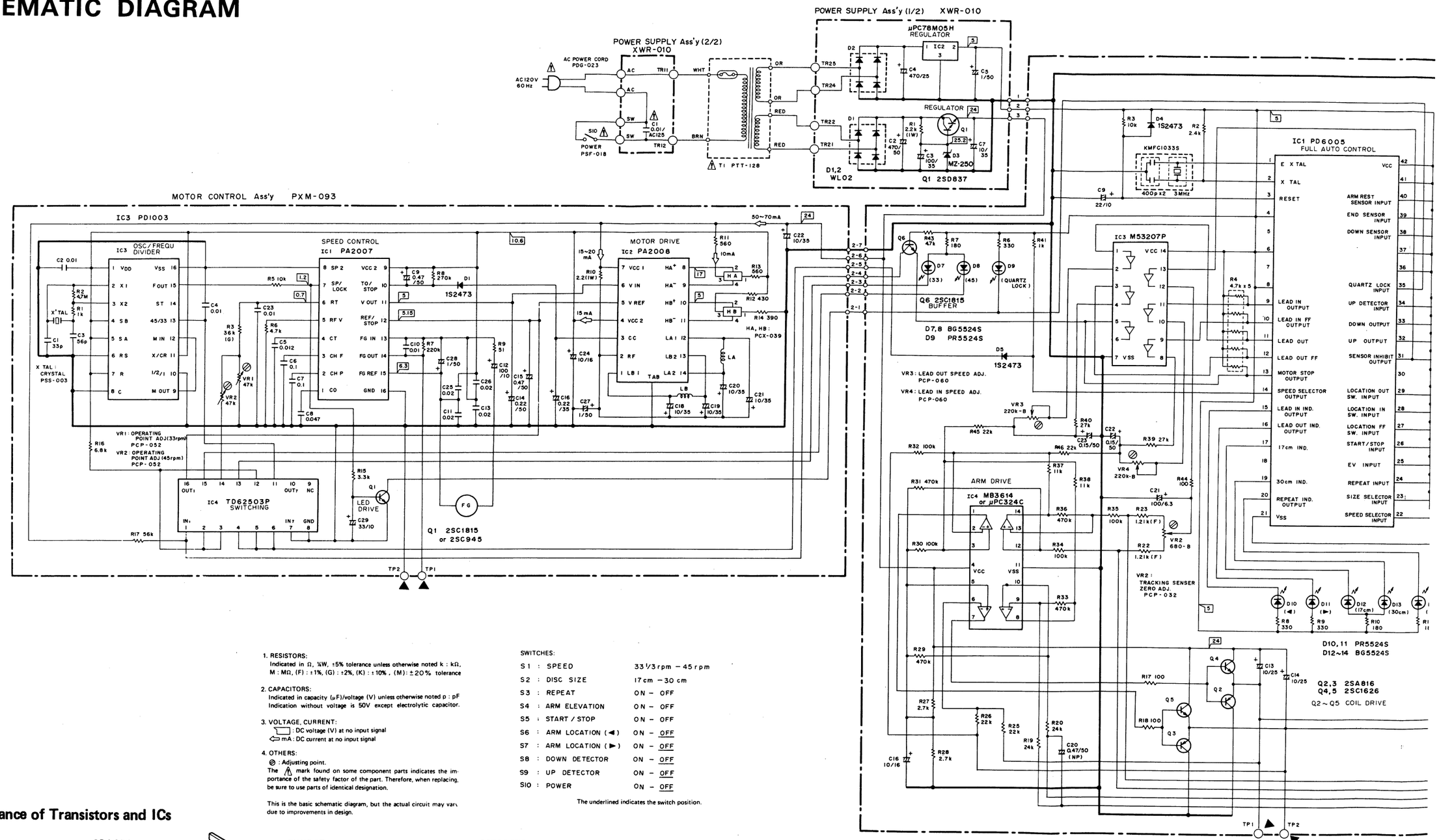
S4 ARM ELEVATION
S5 START/STOP
S7 ARM LOCATION
S6 ARM LOCATION
S3 REPEAT
S1 SPEED
S2 DISC SIZE
REPEAT
(QUARTZ LOCK)
(45) (33) (17cm) (30cm)
D7,8,12~14 BG5524S
D9~11, 15 BR5524S

C

D

4 5 6 7 8 9

10. SCHEMATIC DIAGRAM



1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% , (M): ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: DC voltage (V) at no input signal
mA : DC current at no input signal

4. OTHERS:
: Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

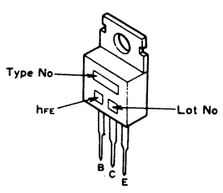
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES:		
S1	SPEED	33⅓rpm – 45rpm
S2	DISC SIZE	17cm – 30cm
S3	REPEAT	ON – OFF
S4	ARM ELEVATION	ON – OFF
S5	START / STOP	ON – OFF
S6	ARM LOCATION (◀)	ON – OFF
S7	ARM LOCATION (▶)	ON – OFF
S8	DOWN DETECTOR	ON – OFF
S9	UP DETECTOR	ON – OFF
S10	POWER	ON – OFF

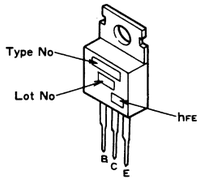
The underlined indicates the switch position.

External Appearance of Transistors and ICs

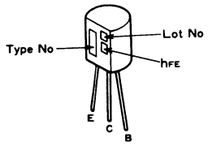
2SA816
2SC1626
2SD837



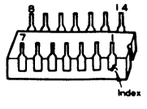
2SA671
2SC1061



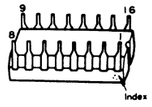
2SC945
2SC1815



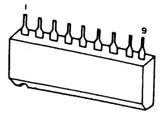
M53207P
MB3614
MB84069B
TC4069UBP
μPC324C



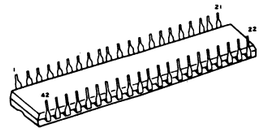
PA2007
PD1003
TD62503P



BA6208



PD6005



PH101

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

POWER SUPPLY Ass'y (2/2) XWR-010

POWER SUPPLY Ass'y (1/2) XWR-010

CONTROL Ass'y XWM-058

IC1 PD6005 FULL AUTO CONTROL

IC2 PA2008 MOTOR DRIVE

IC3 M53207P

IC4 MB3614 or μPC324C ARM DRIVE

IC5 M8840698 or TC4069UBP INVERTER

IC6 BA6208 MOTOR DRIVE

LED Ass'y XWX-063

PHOTO TRANSISTOR Ass'y XWX-062

LAMP Ass'y XWX-064

CdS Ass'y XWX-065

CONNECTOR Ass'y XWX-067

COIL Ass'y

ELEVATION Ass'y XWX-066

ES:	
SPEED	33⅓rpm – 45rpm
DISC SIZE	17cm – 30cm
REPEAT	ON – OFF
ARM ELEVATION	ON – OFF
START / STOP	ON – OFF
ARM LOCATION (◀)	ON – OFF
ARM LOCATION (▶)	ON – OFF
DOWN DETECTOR	ON – OFF
UP DETECTOR	ON – OFF
POWER	ON – OFF

The underlined indicates the switch position.

PA2007
PD1003
TD62503P

BA6208

PD6005

PH101

μPC78M05H

PA2008

11. ADJUSTMENTS

11.1 TRACKING SENSOR ZERO ADJUSTMENT

1. Raise the arm elevation, and adjust VR2 so that the voltage reading between the TP1 and TP2 (Control ass'y XWM-058) test points is ±0.5.
2. Then move arm elevation up and down several times and return it to the up position. Check that the voltage across TP1 — TP2 does not exceed ±2V (Fig. 11-1).
   *Repeat the above steps until the specified rating is satisfied.
   *When lifting the arm elevation, also check that the stylus is 9mm ±2mm above the record surface, and that the elevation tip rests in the V-shaped groove (Fig. 11-2).
3. If the voltage across TP1 and TP2 exceeds ±2V as a result of "play" in the elevation bearing of tonearm, the tonearm is considered defective and must be replaced.

11.2 LOCATE SPEED ADJUSTMENT

1. Remove the platter and the upper cover, and check that the turntable and the carrier ass'y are both horizontal.
   Also check that a suitable tracking force has been set.
2. Keep the locate-in button (◄) depressed at the 1st level, and adjust VR4 so that the stylus tip moves at a rate of 50mm in 7.1±0.7 seconds (Fig. 11-1).
3. In the same way, keep the locate-out button (►) depressed at the 1st level, and adjust VR3 to again obtain at stylus tip movement of 50mm in 7.1±0.7 seconds (Fig. 11-1).

11.3 TONEARM LOWERING POSITION ADJUSTING

When the tonearm doesn't lower in the right position during automatic playback, adjust according to the following procedures. (Be careful not to damage the record disc with the stylus while making this adjustment.)

1. Place a 30cm record on the platter.
2. Depress the playback START/STOP button and start automatic playback. Note the direction and amount the lower position is off. (①)
3. Depress the arm elevation switch and raise the tonearm (arm-elevation lamp ▼ illuminated.). (②)
4. Depress the power switch to turn power off. (③)
5. After the platter stops turning, remove the rubber plug from the adjustment screw hole.

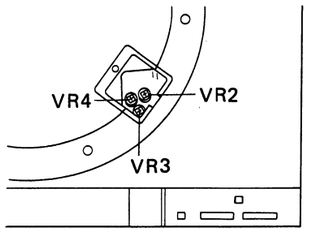


Fig. 11-1 Tracking sensor zero adjustment

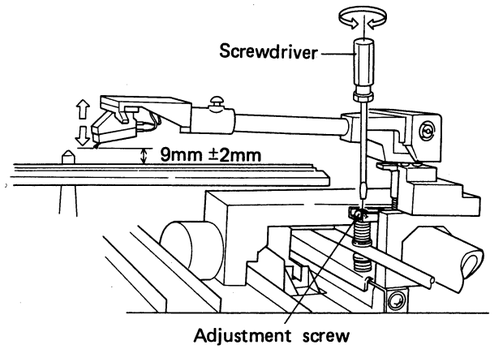


Fig. 11-2 Arm-elevation adjustment

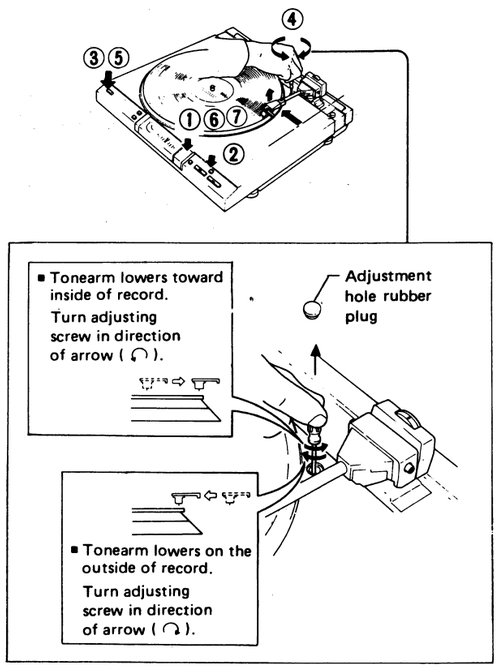

④
③⑤
①⑥⑦
②
■ Tonearm lowers toward inside of record.
Turn adjusting screw in direction of arrow (↺).
Adjustment hole rubber plug
■ Tonearm lowers on the outside of record.
Turn adjusting screw in direction of arrow (↻).

Fig. 11-3 Tonearm lowering position adjusting

6. Using a small flat-bladed screwdriver, turn the adjustment screw to correct the offset noted in item 2. above. (④)
   - When the stylus lowers to the outside of the record, turn the screw clockwise (↻).
   - When the stylus lowers too far to the inside of the record, turn the screw counterclockwise (↺).
7. Turn power on again (⑤), depress the playback START/STOP buttom and return the tonearm to the arm clamp. (⑥)
8. Depress the playback START/STOP buttom and check the adjustment (⑦). If the lowering position is still off, repeat steps 3. through 8 above.
9. Replace the rubber plug after adjustment has been completed.

11.4 MOTOR OPERATING POINT ADJUSTMENT

1. Set the speed to 33 1/3 rpm and depress the START/STOP button to put the unit into the operational mode.
2. Connect a buffer amp to pin 1 of IC PA2007, and connect the output to a oscilloscope (Fig. 11-4).
3. When a waveform like that shown in Fig. 11-5 is obtained, vary oscilloscope gain until a sawtooth wave with 5 div peak-to-peak is obtained. Then, referring to Fig. 11-5, adjust VR1 until a to b equals 3 to 2. (Make sure noise does not affect adjustment.)
4. When the 33 1/3 rpm adjustment is completed, adjust VR2 using the same procedure (item 2 and 3 above) for 45 rpm. Always adjust 33 1/3 first, and always adjust 33 1/3 if 45 rpm is to be adjusted even though it might be accurate.
5. Connect pin 7 of PA2007 to a oscilloscope and make certain the frequency for 33 1/3 rpm is 55.5Hz, and that for 45 rpm is 75Hz.

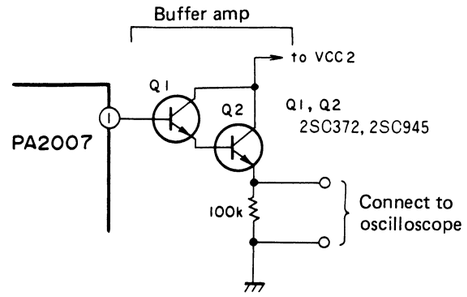


Fig. 11-4 Connect buffer amp

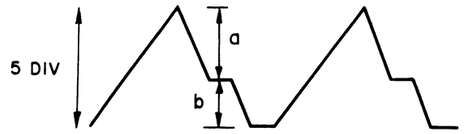


Fig. 11-5 Waveform

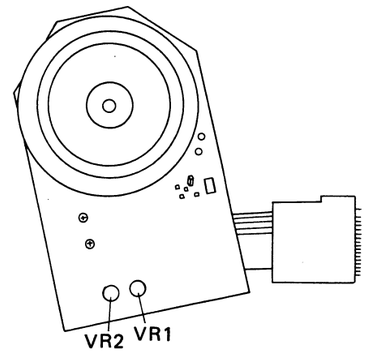


Fig. 11-6 VR1, VR2 position

6. Using a small flat-bladed screwdriver, turn the adjustment screw to correct the offset noted in item 2. above. (④)
   - When the stylus lowers to the outside of the record, turn the screw clockwise (↷).
   - When the stylus lowers too far to the inside of the record, turn the screw counterclockwise (↶).
7. Turn power on again (⑤), depress the playback START/STOP buttom and return the tonearm to the arm clamp. (⑥)
8. Depress the playback START/STOP buttom and check the adjustment (⑦). If the lowering position is still off, repeat steps 3. through 8 above.
9. Replace the rubber plug after adjustment has been completed.

11.4 MOTOR OPERATING POINT ADJUSTMENT

1. Set the speed to 33 1/3 rpm and depress the START/STOP button to put the unit into the operational mode.
2. Connect a buffer amp to pin 1 of IC PA2007, and connect the output to a oscilloscope (Fig. 11-4).
3. When a waveform like that shown in Fig. 11-5 is obtained, vary oscilloscope gain until a sawtooth wave with 5 div peak-to-peak is obtained. Then, referring to Fig. 11-5, adjust VR1 until a to b equals 3 to 2. (Make sure noise does not affect adjustment.)
4. When the 33 1/3 rpm adjustment is completed, adjust VR2 using the same procedure (item 2 and 3 above) for 45 rpm. Always adjust 33 1/3 first, and always adjust 33 1/3 if 45 rpm is to be adjusted even though it might be accurate.
5. Connect pin 7 of PA2007 to a oscilloscope and make certain the frequency for 33 1/3 rpm is 55.5Hz, and that for 45 rpm is 75Hz.

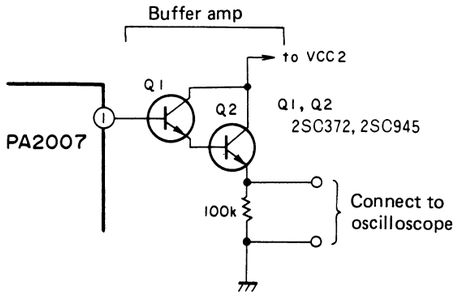


Fig. 11-4 Connect buffer amp

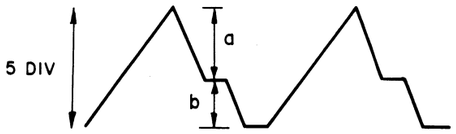


Fig. 11-5 Waveform

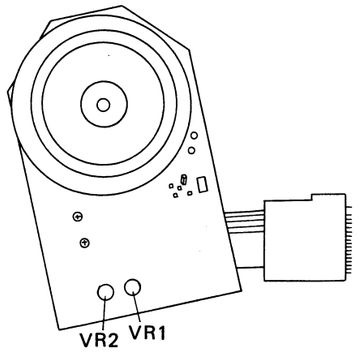


Fig. 11-6 VR1, VR2 position

11. RÉGLAGE

11.1 REGLAGE DU ZERO DU CAPTEUR D'ALIGNEMENT

1. Relever le bras et régler VR2 de manière à ce que la tension entre les points d'essai TP1 et TP2 (ensemble-conlrolleur XWM−058) soit de ±0,5.
2. Faire ensuite monter et descendre le bras à plusieurs reprises puis le remettre en position haute. Vérifier que la tension entre TP1 et TP2 ne dépasse pas ±2V (Fig. 11-1).
   * Répéter l'opération ci-dessus jusqu'à ce que la valeur spécifiée soit obtenue.
   * Lors de la montée du bras, vérifier que l'extrémité de la pointe de lecture se trouve à 9 ±2mm au-dessus de la surface du disque et que l'extrémité de la pointe du lève-bras se trouve dans la gorge en "V" (Fig. 11-2).
3. Si la tension entre TP1 et TP2 dépasse ±2V, en résultat d'un "jeu" dans le palier du lève-bras ou dans le bras de lecture, celui-ci est défectueux et doit être remplacé.

11.2 REGLAGE DE LA VITESSE DE LOCALISATION

1. Retirer le plateau et le capot supérieur, puis s'assurer que le tourne-disque et l'ensemble-Porteurs sont tous les deux horizontaux.
   Vérifier aussi que la force corrective d'erreur de piste a été réglée correctement.
2. Garder le bouton d'enclenchement de la localisation (▶) enfoncé au premier niveau et régler VR4 de manière à ce que l'extrémité de la pointe de lecture se déplace à la vitesse de 50mm en 7,1 ± 0,7 secondes (Fig.11-1).
3. De la même manière, garder le bouton de déclenchement de la localisation (◀) enfoncé au premier niveau et régler VR3 de manière à ce que de nouveau la pointe de lecture se déplace à la vitesse de 50mm en 7,1 ± 0,7 secondes (Fig. 11-1).

11.3 REGLAGE DE LA POSITION DE DESCENTE DU BRAS DE LECTURE

Lorsque le bras de lecture ne descend pas sur la position correcte en mode de reproduction automatique, régler le bras de lecture en suivant les indications suivantes. (Prendre soin de ne pas abimer le disque avec la pointe de lecture lors du réglage.)

1. Placer un disque sur le plateau de lecture.

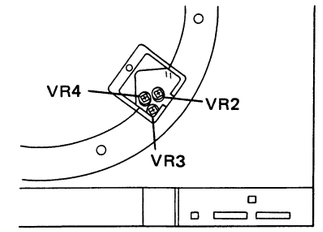


Fig. 11-1 Réglage du zéro du capteur d'alignement

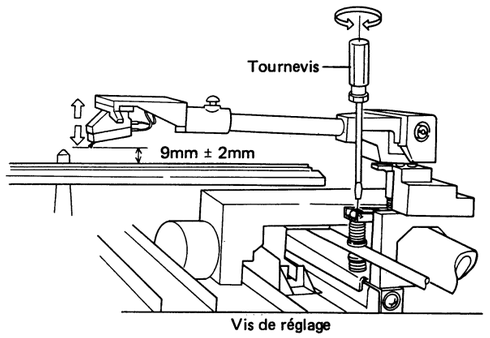


Fig. 11-2 Réglage de la levée du bras

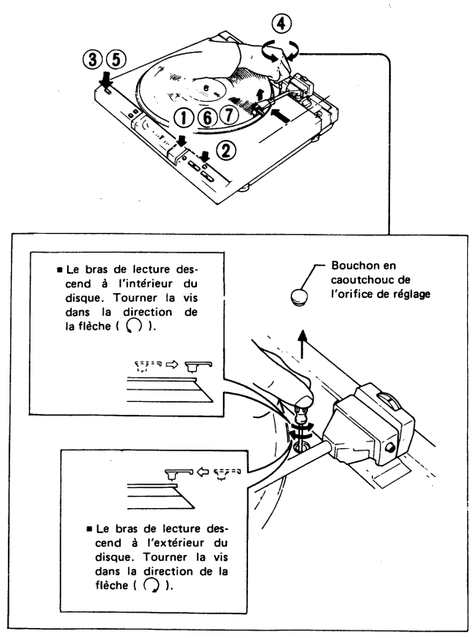

④
③⑤
①⑥⑦
②
■ Le bras de lecture descend à l'intérieur du disque. Tourner la vis dans la direction de la flèche (↶).
Bouchon en caoutchouc de l'orifice de réglage
■ Le bras de lecture descend à l'extérieur du disque. Tourner la vis dans la direction de la flèche (↷).

Fig. 11-3 Réglage de la position de descente du bras de lecture

11. AJUSTE

11.1 SENSOR DEL SEGUIMIENTO · AJUSTE A CERO

1. Subir la elevación del brazo y ajustar VR2 de modo que la lectura de la tensión entre los puntos de prueba de TP1 y TP2 (conjunto de mando XWM−058) sea ±0,5.
2. Luego, subir y bajar varias veces la elevación del brazo y volverla a poner en la posición de ascenso. Comprobar que la tensión por TP1 — TP2 no excede de ±2V (Fig. 11-1).
   * Repetir los pasos de arriba hasta lograrse los valores especificados.
   * Al subir la elevación del brazo, comprobar también que la aguja está a 9mm ± 2mm por encima de la superficie del disco, y que la punta de elevación se apoya en el surco en forma de V (Fig. 11-2).
3. Si la tensión por TP1 y TP2 excede de ±2V como resultado del "juego" del rodamiento de elevación o brazo fonocaptor, el brazo fonocaptor se considerará defectuoso y deberá recambiarse.

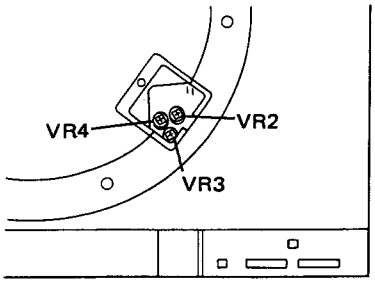


Fig. 11-1 Sensor del seguimiento, ajuste a cero

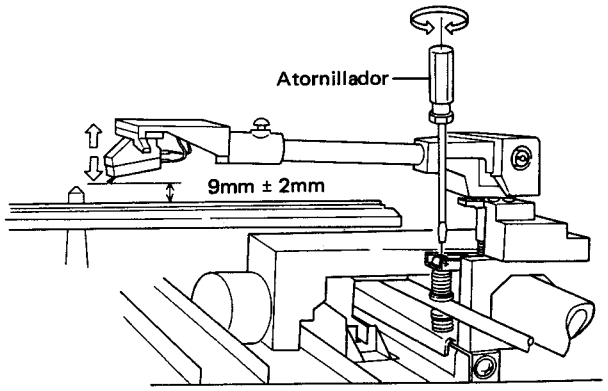


Fig. 11-2 Ajuste de la elevación del brazo

11.2 AJUSTE DE LA VELOCIDAD DEL BRAZO

1. Sacar el plato y la cubierta superior y comprobar que el giradiscos y la conjunto de portadora están ambas horizontalmente.
   Comprobar también que se haya ajustado una fuerza de apoyo adecuada.
2. Mantener el botón de ida del brazo (◀) presionado al primer nivel, y ajustar VR4 para que la punta de la aguja se mueva a una velocidad de 50mm por 7,1 ± 0,7 segundos(Fig. 11-1).
3. De igual modo, mantener el botón de venida (▶) presionado al primer nivel, y ajustar VR3 para conseguir de nuevo un movimiento de la punta de la aguja de 50mm por 7,1 ± 0,7 segundos (Fig. 11-1).

11.3 AJUSTE DE LA POSICIÓN DE DESCENSO DEL BRAZO FONOCAPTOR

Cuando el brazo fonocaptor no desciende en la posición correcta durante la reproducción automática de discos, ajustar de acuerdo con el siguiente procedimiento. (Tener cuidado de no dañar el disco con la aguja mientras se realiza este ajuste.)

1. Poner un disco de 30 cm en el plato.
2. Presionar el botón de inicio/parada de reproducción (START/STOP) e iniciar la reproducción automática. Anotar la dirección y la cantidad de desviación de la posición de descenso. ①

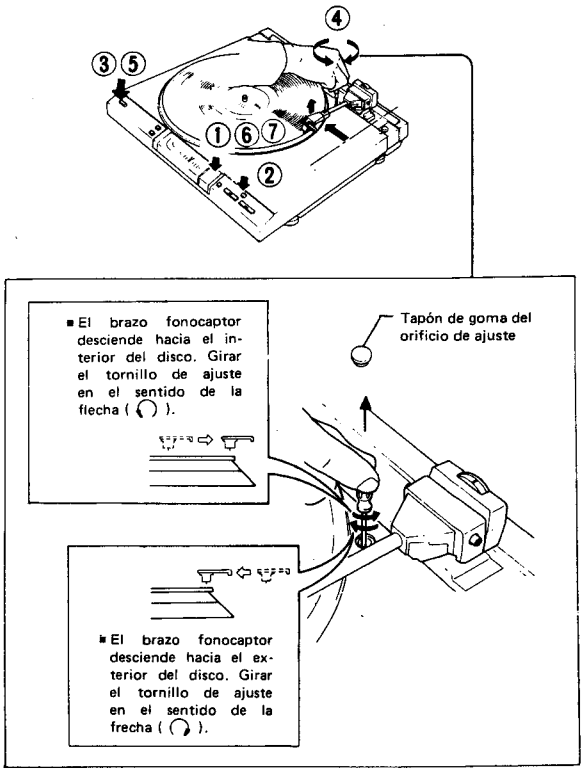

④
③⑤
①⑥⑦
②
■ El brazo fonocaptor desciende hacia el interior del disco. Girar el tornillo de ajuste en el sentido de la flecha ( ).
Tapón de goma del orificio de ajuste
■ El brazo fonocaptor desciende hacia el exterior del disco. Girar el tornillo de ajuste en el sentido de la frecha ( ).

Fig. 11-3 Ajuste de la posición de descenso del brazo fonocaptor

2. Appuyer sur la touche START/STOP Mise en marche/arrêt afin de régler l'appareil sur le mode de reproduction automatique. Vérifier la direction et le degré d'erreur de la descente du bras de lecture. ①
3. Appuyer sur le commutateur de lève-bras et soulever le bras de lecture (la lampe témoin ▼ de lève-bras s'allume.) ②
4. Appuyer sur l'interrupteur général afin de mettre hors circuit l'appareil. ③
5. Après l'arrêt du plateau de lecture, retirer le bouchon de caoutchouc de l'orifice de la vis de réglage.
6. Tourner la vis de réglage à l'aide d'un petit tournevis plat afin de régler le décalage constaté dans le chapitre 2. ④
   - Tourner la vis dans le sens des aiguilles d'une montre lorsque la pointe de lecture descend à l'extérieur du disque (◯).
   - Tourner la vis dans le sens contraire des aiguilles d'une montre lorsque la pointe de lecture descend trop loin a l'intérieur du disque (◯).
7. Mettre de nouveau l'appareil en circuit ⑤ , appuyer sur la touche START/STOP Mise en marche/Arrêt et replacer le bras de lecture sur le pose-bras. ⑥
8. Appuyer sur la touche START/STOP Mise en marche/Arrêt et vérifier le réglage. ⑦
   Si la position de descente est toujours décalée, effectuer de nouveau le réglage en suivant les instructions indiquées ci-dessus dans les chapitres 3 à 8.
9. Remettre le bouchon en caoutchouc après avoir effectué le réglage.

11.4 REGLAGE DE POINT D'ACTIONNEMENT DU MOTEUR

1. Passer sur 33 1/3 tr/mn et appuyer sur la touche START/STOP afin de mettre la table de lecture en marche.
2. Brancher un amplificateur intermédiaire sur la broche 1 du CI PA2007 et connecter la sortie à un oscilloscope (Fig. 11-4).
3. Si la forme d'onde est semblable à celle de la Fig. 11-5, faire varier le gain du oscilloscope jusqu'à ce qu'elle soit en dents de scie avec 5 divisions crête à crête puis, en se reportant à la Fig. 11-5, régler VR1 jusqu'à ce que a à b soit égal à 3 à 2 (veiller à ce qu'aucun bruit ne gêne le réglage).
4. Lorsque le réglage de 33-1/3 tr/mn est terminé, régler VR2 de la même manière (alinéas 2 et 3 ci-dessus) pour 45 tr/mn. Toujours commencer par régler 33-1/3. Si 45 tr/mn doit être réglée, il convient de commencer par régler 33-1/3 tr/mn, même si cette dernière vitesse est bonne.
5. Connecter la broche 7 de PA2007 à un oscilloscope et vérifier si la fréquence est bien de **55,5 Hz pour 33-1/3 tr/mn et de 75 Hz pour 45 tr/mn.**

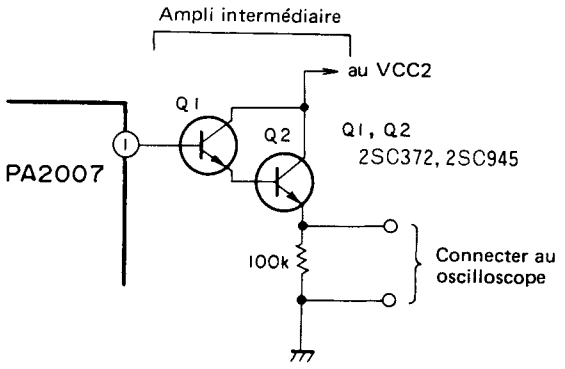


Fig. 11-4 Connexion de l'amplificateur intermédiaire

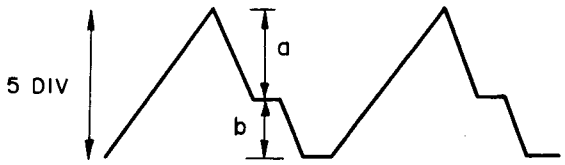


Fig. 11-5 Forme d'onde

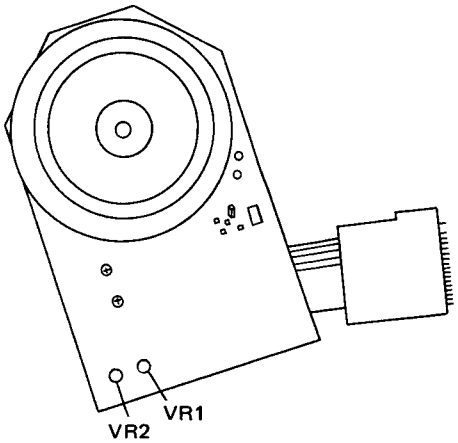


Fig. 11-6 Position de VR1 et VR2

3. Presionar el interruptor de elevación del brazo y hacerlo elevar (se ilumina la lámpara ▼ de elevación del brazo). ②
4. Presionar el interruptor de la alimentación para desconectar la alimentación. ③
5. Una vez el plato ha dejado de girar, extraer el tapón de goma del orificio del tornillo de ajuste.
6. Empleando un destornillador pequeno de cabeza plana, girar el tornillo de ajuste para corregir la desviación observada en el paso 2 de arriba. ④
   - Cuando la aguja desciende en el exterior del disco, girar el tornillo hacia la derecha (↻).
   - Cuando la aguja desciende demasiado en el interior del disco, girar el tornillo hacia la izquierda (↺).
7. Conectar de nuevo la alimentación ⑤ , presionar el botón de inicio/parada (START/STOP) y retornar el brazo fonocaptor a su apoyo. ⑥
8. Presionar el interruptor de inicio/parada (START/STOP) y comprobar el ajuste. ⑦ Si la posición de descenso está aún mal ajustada, repetir los pasos 3 al 8 arriba mencionados.
9. Volver a colocar el tapón de goma después de haber terminado el ajuste.

11.4 AJUSTAR DEL PUNTO DE FUNCIONAMIENTO DEL MOTOR

1. Ajustar la velocidad a 33-1/3 rpm y presionar el botón START/STOP para poner el aparato en el modo de funcionamiento.
2. Conectar un amplificador intermedio a la pastilla 1 del IG PA2007 y conectar la salida a un oscilloscopio (Fig. 11-4)
3. Cuando una forma de onda como la mostrada en la figura 11-5 es obtenida, variar la ganancia del osciloscopio hasta que la onda de dientes de sierra se obtenga 5 divisiones de pico a pico. Luego refiriéndose a la figura 11-5 ajustar VR-1 hasta que a-b iguale 3 a 2 (estar seguros que el ruido no afecta el ajuste).
4. Cuando el ajuste a 33-1/3 rpm es completo, ajustar VR2 utilizando el mismo procedimiento (puntos 2 y 3 de arriba) para 45 rpm. Siempre ajustar a 33-1/3 primero, y siempre ajustar 33-1/3 si tiene que ajustar 45 rpm. con precisión.
5. Conectar la pastilla 7 del PA2007 al osciloscopio y estar seguro que la frecuencia de 33-1/3 rpm es de 55,5 Hz y que para 45 rpm es de 75 Hz.

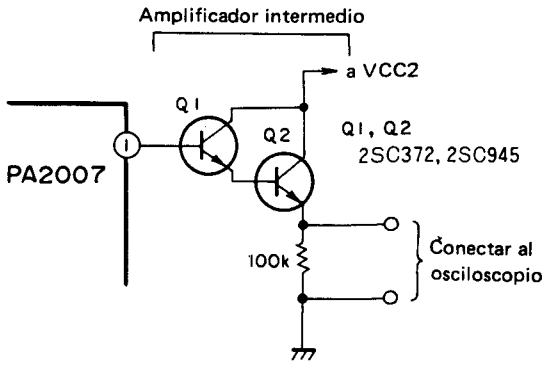


Fig. 11-4 Conectar al amplificador intermedio

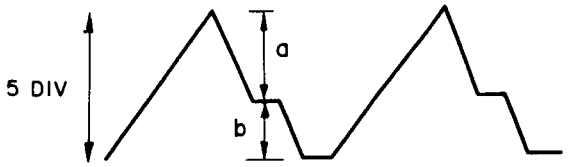


Fig. 11-5 Forma de onda

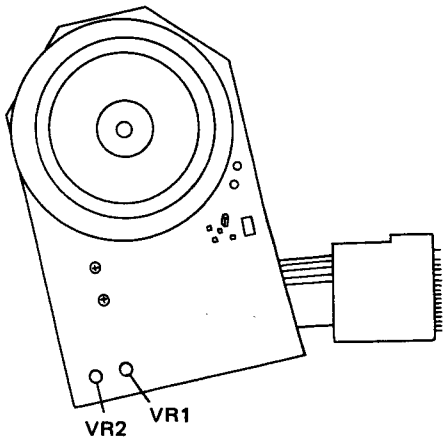


Fig. 11-6 Posiciones de VR1 y VR2